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**SOCIO-ECONOMIC DETERMINANTS OF CHILD SCHOOLING IN
RURAL HOUSEHOLDS OF ETHIOPIA**

By

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Glossary of Abbreviations

CSA	Central Statistics Agency
DHS	Demographic and Household Survey
ERHS	Ethiopian Rural Household Survey
ESDP's	Education Sector Development Plans
MDGs	Millennium Development Goals
MOE	Ministry of Education
SNNPRS	South Nations and nationalities People Regional State
UNICEF	United Nations International Children's Emergency Fund
UNESCO	United Nations Educational, Scientific and Cultural Organization



Abstract

Education, being the major element in human capital theory, is analyzed in different perspective as it plays a pivotal role for the development of any country. The main objective of the study was therefore to understand the major micro level socio-economic determinants of child schooling in the case of rural Ethiopia. These determinants of schooling were initially hypothesized to include child's own characteristics; like age, marital status, gender, and participation in labour activities, Household characteristics; like head's age, marital status, gender, occupation, and education with household size, availability of toilet and pipe water, educational expense and eqqub membership last one was the community level variables which include, availability of electricity and pipe water in the community and, distance to school.

Two models, binary probit model and ordered probit model, were used to estimate child schooling, current attendance and highest grade attained given by the current enrollment and the highest completed grades of children, respectively. Rural villages' representative cross-section data from the ERHS of the 7th round were employed in the analysis.

The main findings of the result supported the hypothesis that education, age, availability of pipe water in the household are positively related to schooling outcome. The region where the household resides also has an effect on child schooling. Household size and gender however, were found to be insignificant in explaining child schooling in the rural areas. In addition, some variables found to be significant for the two models uniquely.

The finding of the study revealed that schooling decision is influenced by the analyzed socio-economic variables and achieving a high level of education requires all rounded sustainable development with well devised policies.



CHAPTER ONE

INTRODUCTION

1.1. Background

"If you educate a child you educate a nation. By them our future can be made brighter"
UNESCO

Globally, there is a wide recognition of the importance of education in achieving socioeconomic development of countries in general and particularly in the developing world where low human capital base is the biggest constraint to development (Psacharopoulos and Arrigagada, 1987 and UNESCO, 2008).

This belief that education is a powerful engine of growth for a nation rests upon the quality and quantity of education provided in that country. In addition, the provision of formal education is highly instrumental in improving the overall production capacity of a nation. Education, according to human capital theory, is an investment that is made in return for future income. Moreover, education creates improved citizens and upgrades the general standard of living in a society (Olanian and Okemakinde, 2008).

Even though, human capital's role in socio-economic development has been underscored in various studies in general, education is recognized as an important aspect of human capital formation which is vital in increasing the productive capacity of people at large (Sackey, 2007). Above all education is a fundamental human right as well as a catalyst for economic growth and human development (World Bank, 1993 and O'kidi et al 2004 as cited in Ibrahim. et al (2008)).

A major concern that has emerged over the last decade has been the need to ensure that children, particularly the girl-child, are given the requisite opportunity to access basic education in their



respective communities. Because they constitute the future human capital of the society and therefore have potential to exert significant impact on growth and development, hence children's full participation in basic education is an end result for societal progress (Sackey, 2007).

The Dakar frame work for action held in 2000, which reaffirmed the universal right for education, encouraged participant countries to commit themselves to achieve the education for all goals by 2015. There were six major goals to be attained by 2015; some of these goals were universal access to completely free and compulsory education, elimination of gender disparities and increase in adult literacy rate. Many countries have been and are working towards achieving these objectives by 2015.

Despite the increase in school enrollment in recent years, governments' commitment to provide free education, and parents increasingly positive attitude towards sending their children to school , according to MoE (2008), child enrollment rate in developing countries is still far from universal and what is required to attain education for all and achieve millennium development goals (MoE, 2008).

In addition unlike the increased recognition of the importance of learning in the early years, many children in developing countries still do not have access to any early childhood development opportunities. And many children arrive at school later than the prescribed starting age. Over-age children without basic early learning skills are likely to perform poorly and drop out early. This in turn undermines efforts to improve school retention and completion rates and learning achievement (UNICEF, 2008). Hence, low enrollment rate, low quality of education, high gender disparity, high dropout rates and low level of grade completion are still the major features of most developing countries; Ethiopia with no exception.



Thus, a major trend in education in developing economies in general, and Ethiopia in particular, is that schooling attainments are relatively low and observed differences in such attainments between males-females and urban-rural exist, with those of the latter lagging behind the former. The 2000 UN Millennium Summit denounced the gender gap in education and pushed forward the goal of narrowing this gap, in line with the education for all objectives. Reversing this trend appears to be a major concern of governments in developing economies, Ethiopia inclusive and this is reflected in the design of new education policies.

1.1.1 Current Context and Educational setting in Ethiopia

Ethiopia has an area of 1.1 million square kilometers. The country is known for its diverse languages, culture and topography. And according to the Central Statistics Authority (CSA) projection, the total population in the country is estimated to reach 81.3 million in 2009/10. Out of the total population of the country, 15% live in urban and 85% is rural. The male/female proportion of the population is almost the same with a total of 35.6 million (50.1%) males and 35.4 million (49.9%) females. While, the primary school age population (7-14) will reach 16.5 million in the same year (MoE, 2010/2011).

With regard to the economic situation of the country, about 85% of the population earns its living from rain-fed subsistence agriculture which constitutes 42.1% of the GDP (MoE, 2010/2011). In addition, Agriculture employs about 80 percent of the population and accounts for about 90 percent of the exports (CSA, 2000). The country is one of the poorest in the world with per capita income not exceeding 100 USD, and where about 44 % of the population lives below the poverty line. The country has adopted federal governance with nine regions and two city administrations (MoE, 2010/2011).



The Education system in the country is a three tier system: General education, consisting of primary and secondary schooling of 12 years and some special and alternative education facilities, Technical and vocational education and training (TVET), and higher education. Primary education in Ethiopia consists of two cycles of four years each: first primary cycle being 1-4 grades and second cycle 5-8. The secondary level also consists of two cycles of two years each: 9-10 and 11-12. Those students who complete 10 years of schooling may either enter the second cycle to prepare for higher education, or enter the TVET institutions to be trained for productive employment (MoE, 2010).

Primary education, which is composed of both cycles, is compulsory for Children of ages 7-14 years (MoE, 2007/2008). This is to have all children entering grade-1 by the age of 7, which is in the pathway towards MDGs¹ of universal primary education. Late entry means a 7-years old is out of school, which is not compatible with universal primary education. As reported in education public expenditure review (2010), more and more families are deciding to send their children to school by the time they are 7 and over-age entry is declining in all regions. For instance in SNNP region, though registered high dropout rate, the proportion of children entering at age 7 showed a rapid increment from 39% to 80% during 2004-08 and the progress in age at entry in Oromia lag roughly two years behind SNNPR (MoE, 2010). However, Only 21% of children at age seven are attending school, indicating that a large majority of children on that age in Ethiopia have not entered the school system (DHS, 2005).

¹ It is for the millennium development goals.

1.2. Statement of the Problem

Education is a fundamental human right that every child is entitled to (UNICEF, 2008). Education is a basic human right. Like all human rights, it is universal and inalienable—everyone, regardless of gender, religion, ethnicity or economic status, is entitled to it. Universal access to free and compulsory primary education, universal availability/accessibility of secondary education, in particular by the progressive introduction of free education; equal access to higher education on the basis of capacity, in particular by the progressive introduction of free education are form part of these rights (UNICEF, 2008).

Yet in 2006, 93 million children around the world—more than the total population of the Philippines—were not in school (UNICEF, 2008). Almost 80 percent of these children lived in sub-Saharan Africa and South Asia. According to UNICEF, (2008) for too many children, the basic human right to education is a pipe dream, an idea that has not become reality.

Ethiopia, like the other developing countries is working towards achieving success in education for all objectives. Within the framework of the 1994 Education and Training Policy (ETP) the Government of Ethiopia launched the first five year Education Sector Development Program (ESDP-I) in 1997 as part of a twenty-year education sector indicative plan which has been translated into a series of national ESDPs ²(UNICEF 2010). It is launched in to ultimately achieve the education for all objectives by 2015, and narrow the gap between rural urban and boys and girls education (MoE, 2010/2011).

² Education Sector Development Plan (ESDP) is created within the framework of the 1994 Education and Training Policy (ETP). And the Government of Ethiopia launched the first five year Education Sector Development Program (ESDP-I) in 1997 as part of a twenty-year education sector indicative plan which has been translated into a series of national ESDPs



Ethiopia, on average, has registered annual increase in enrollment over the past five years (MoE, 2008/2009). It shows that there has been an increase in school attainment, 30.5% for TVET, 22.3% for higher education, undergraduate, 29.5% for higher education post graduate, 8.0% for primary and 13.6% for secondary education (MoE, 2008/2009). In this regard the country has seen extraordinary expansion of its education system. In 1992, four out of five primary school age children were out of school. In 1999, this figure stood at over 60%. Now, this ratio has fallen to one out of five (MoE, 2008/2009).

Beyond enrollment rate however, gender gap complemented by the rural urban disparity and regional variations are some of the characteristics of the Ethiopian educational system. For instance, the school attendance ratios at the primary school level, in 2005, show that Addis Ababa with 83% followed by Dire Dawa 60.6% has registered the highest. While SNNP with 37.2% is only higher than the two pastoralist regions, Afar (19.1%) and Somali (15.5%) who has registered the least in the same year (DHS, 2005). In a recent study about primary completion rate, the researchers found that the greatest dropout rate was observed in Addis Ababa city (31.24percent), followed by SNNP (19.93percent), while the lowest dropout rate was in Tigray Region (7.08percent), which shows that there is also a very large variation among different regions (Tassew et al, 2010).

In addition, the repetition rate, a student remaining in the same grade level for more than one year, and dropout rates, those who leave formal schooling is still the highest especially for the girls in the rural areas (MoE, 2008/09). This directly or indirectly affects child's grade attainment level. In addition, despite its long history in providing education Ethiopia's literacy rate also about 40% falls behind many African countries (UNICEF, 2010), which again affects the child



grade attainment level. Hence many children continue to receive little or no education and school attainment and attendance level remains to be the lowest (Anderson, 2004).

Generally, although the Ethiopian government education policy objective is to ensure that all people, irrespective of gender and socioeconomic status, have some level of literacy, this objective is far from being realized. The education sector is saddled with various problems that tend to work against the attainment of education policy objective. Notable among these are the actual attendance being far from enrollment and low enrolments especially for the poor, rural and females and high dropout rates which leads to poor and lowest educational/grade attainment level.

An understanding of the determinants which influence child schooling thus would enable policy makers to adopt strategies to improve the allocation of resources, with the objectives of increasing school completion and reducing the inequality in attendance level. From the literature, the already identified factors/determinants may in fact play a role in any situation, but that the degree to which they are important depends on the characteristics of the context. This means that standard solutions to such problems often do not work and that policy measures aimed at improving child schooling should be as specific as possible (Huisman and Smits, 2009).

Despite the documented role of education as a catalyst for economic and social development, especially for a country like Ethiopia, there are few studies done in this regard. These studies show that there are improvements in primary school attendance and attainment in Ethiopia. However, no recent studies have analyzed extensively the determinants of child schooling (grade attainment/school attendance) in rural Ethiopia as a whole using a recent data. Since the schooling developments vary greatly across different societies and regions of the country due to

differences in social organization, economic conditions, cultural orientation and different values in each setting.

Hence in the absence of in-depth studies on the determinants of child education, policies may lack empirical relevance. Thus a study on the determinants of school attainment in each setting is imperative to come up with relevant policy recommendations that would result in increasing child schooling. Hence the present paper is going to analyze the socio-economic determinants of child schooling in rural Ethiopia and tries to fill the knowledge gap in this regard.

1.3. Objective of the Study

With rural Ethiopia as a specific analysis, the general objective of this paper is to identify the major socio-economic determinants of children current school enrollment and school attainment at the household level in school age children and the reasons why students are out of school in the rural part of Ethiopia and come up with relevant policy recommendations.

The specific objectives are:

- To assess the impact of child characteristics, parental and community (demand) factors on child's schooling.
- To assess the determinants of school attendance and grade attainment of children at the household level separately.
- To indicate some policy implications.

1.4. Research questions

The research questions of the paper are:

- What are the major socio-economic determinants of children's schooling?



- Among household, child or community characteristics which one play a more significant role in determining child's schooling in the villages?
- Why do students never attend school or drop out of school before completing basic primary education? What are the reasons for low grade attainment?

1.5. Data and methodology

Micro data are going to be employed to analyze the socio-economic determinants of child schooling. The data set to be used is the Ethiopian Rural Household Survey (ERHS). The appropriate econometric models are going to be employed to understand the direction and significance of the variables that are expected to affect schooling at the household level.

1.6. Significance of the study

Since there are no recent works done on the determinants of child schooling in specific villages of rural Ethiopia, where the gravity of the problem expected to be high. The study will be beneficial since it will add on to the existing stock of knowledge on child schooling.

Hence this paper will be used as a spring board for further research in the area under review and will be of much use to different concerned stakeholders, like the government, NGO's, and Policy formulators. It will help the later to investigate and examine the source of the problem and the proposed solutions for future policy production and implementation.

1.7. Limitation of the study

In the analysis of the study, child schooling is measured by two measurements, current school attendance and grade attainment. Current school attendance measures the current enrollment of children whether they are currently enrolled or not and there is no problem with its measurement. However grade attainment is a bit complex as it measures the highest grade level that the

children want to attain. This has its own drawback and complexity since it considers those children who are currently in school and those who never been in school, quit school or finished schooling. This may be difficult in analyzing and lack to identify the actual grade attainment level of a child.

The other limitation is the availability of sufficient and comprehensive data on the supply side (school side) factors and other variables that are supposed to be a determinant factor that affects child schooling, since the data collected was not directly on the purpose of analyzing child schooling. In this regard some proxy variables are going to be employed where necessary.

1.8. Outline of the study

The rest of the paper is organized as follows: chapter two discusses about the theoretical and empirical works that can be used as a base for the research, while chapter three gives a description about the theoretical framework of the paper, data and methodology employed, and chapter four will discuss about the descriptive and estimation results, their bivariate relationship between the different variables and also analyzes and discusses the regression results found from the two models and the last chapter, chapter five will, based on the results, conclude and recommend.

CHAPTER TWO

LITERATURE REVIEW

2.1. Theoretical Literature

Education has since long been viewed as an important determinant of economic well-being. The theoretical growth literature emphasizes at least three mechanisms through which education may affect economic growth. First, education can increase the human capital inherent in the labor force, which increases labor productivity and thus transitional growth towards a higher equilibrium level of output as in augmented neoclassical growth theories (Mankiw, Romer, and Weil (1992)). Second, education can increase the innovative capacity of the economy, and the new knowledge on new technologies, products and processes promotes growth as in theories of endogenous growth, (e.g., Lucas (1988); Romer (1990); Aghion and Howitt (1998)). Third, education can facilitate the diffusion and transmission of knowledge needed to understand and process new information and to implement successfully new technologies devised by others, which again promotes economic growth (Nelson and Phelps (1966); Benhabib and Spiegel (1994) as cited in Hanushek and WoBmann, 2008).

2.1.1. Concepts and Definitions

School attendance is a broad concept which can amalgamate different situation of children's status (Crighton, 2005). For instance, truants are students of compulsory school age who are not in school for the required number of lessons, classes or days in the school calendar. Non-attendance Students are students who are registered in a particular school but do not attend classes for long periods not of time for unexcused reasons, but who are deleted from the school register. Irregular Attendance means students who are registered in a particular school but do not attend school classes regularly. Non-Enrolment or Non- Registration means Children of

compulsory education age who were never enrolled (registered) in a school and attended school at all (Crighton, 2005). Dropout rate is the measure, typically by grade, of those who leave formal schooling. In most cases it is calculated as the remainder after subtracting from enrollment, those who repeat and those who are promoted to the next grade (MoE, 2008/09). Dropping out from school occurs after children have previously achieved access to school. It is often obscured with in statistical data and by emphasis on initial access (Hunt, 2008). Drop-outs are students of Compulsory school ages or grades who are either--not in school at the end of the school year, not finishing a grade at the basic (compulsory) school level; not registered for the new school year; have not received the certificate of basic education for the respective age group (Crighton, 2005).

The prevalence of non attendance in whichever category varies between and within countries and occurs more frequently in certain age ranges and grade levels (Hunt, 2008). School attendance might be the total loss of chance to currently attend or not being in school in any one of the above reasons at the time of the survey. Whereas Grade attainment refers to a child successfully completing his/her schooling or some grade level or graduating from school or the future desired level of grade level achieved after attending school or even zero years of schooling.

In reviewing various literatures the paper come up with a number of factors that can have an influence on children's schooling with their respective direction of influence as a theoretical base. These literatures suggest that there are ranges of interrelated demand and supply side factors interact to influence how and why children decide to attend or to be out of school. The demand side factors include those factors that have an influence on the decision of the household, community and characteristics of the child to educate the child. While the supply side factors are those factors that are related to the provision of education.



2.1.2. Determinants of school attendance and grade attainment

I. House hold Context

1. Economic characteristics of the household

According to various literatures children from families with better economic status and resources such as; Income, assets and wealth are more likely to attend school (Holmes, 1999; Lincove, 2009; Chishti et.al, 2009; Psacharopoulos and Arriagada, 1987; Dumas and Lambert, 2005).

The household will face direct and indirect costs while sending their children to school. The time allocated for school attendance is input in the education process, which could be used to participate more fully in the labor market or home production, and therefore school time represents forgone earnings or gains to households—an indirect cost of education (El Daw A. and Safaa E., 2002). The indirect costs or the opportunity costs of the house hold is that the forgone time of the child's working either in the farm, home chore activities or to be employed to any income earning activity. It is the time the child will be home if they wouldn't have sent the child to school. Hence this is a cost for the household. The direct costs include school fees, children's uniform, transportation cost for the child, some cash for food, or any other expenses which may squeeze the household limited budget and make school expenses unaffordable for poor households. Such resource constrains may even bear significant implications on parents' decision to send girls to school (El Daw A. and Safaa E., 2002, Holmes, 1999 and Lincove,2009). Thus for the wealthier households the direct costs associated to education may not be as such difficult to cover and, the opportunity cost of the children may be insignificant for these households. In addition the wealthier families are less likely to be affected by the credit constraints and shocks.

In this regard, wealthier parents will have the capacity to send the child to school which increases school attendance, decreases the likelihood of dropout and increase in grade attainment.

2. Income shock in the household

Various literatures also include shocks as a major factor in determining children's education in many ways (Tassew et.al, 2010). When shocks occur the household will take different measures for the survival of the household as a whole. One among the major measures may be the decision of the household to dropout their child from school or by not letting them join school in the first place. The household may decide to migrate to other places, or the household may decide to take out the child from school so that the child can work and bring some more amount of income for the family, or because the household can't afford to pay the school expenditure for the child.

In any case the child will be forced or choose to leave school. Hence the child's probability to attend school decreases and drop out will increase which have a negative impact on grade attainment.

3. Education level of the household member

Household education levels have a major impact on child's education. Various literatures agree that when the parents or the other family members' education level increases it affects the decision of sending the child to school positively. (El Daw A. and Safaa E. 2002; Psacharopoulos and Arriagada, 1987; Giannelli and Mangiavacchi, 2010). Parents who have reached a certain level of education at least want their children to reach at that stage.

When the education level of the parents or the other household members gets higher, the probability of the child's school attendance will also increase. The reason is that the value the

educated parents attach to education is much greater than less educated families and will tend to send their child more to school. In addition home environment of the household of the educated parents may be more conducive for the child in many ways, and this can increase the achievement of the child and this will decrease the likelihood of dropping out of school though the consistency may differ across countries.

4. Household perceived benefit of schooling and labour market position

According to the human capital theory (Becker, 1964) households invest on their child's schooling now with the expectation of future return. Households made this decision given their time and financial constraint. They will make the comparison between current expenditure and future benefit. Hence as any rational agent they will weigh the benefit and cost and send their children to school as long as the outcome of the investment, the return of sending the child to school, is worthier either for the household or for the child than the cost they incur today.

The household in making the decision of sending the child to school is thus may be affected by the perceived benefit it will expect from the labour market. If the labour market reward for the more educated ones is inelastic then the perceived benefit from schooling must decrease and this will lead to the decision not to send their child to school. In addition the parents or the other household members themselves gain an unsatisfactory reward from the labour market they may discourage their children or siblings to go to school. For instance the availability of white collar jobs may affect schooling decision positively (El Daw A. and Safaa E. (2002); Huisman and Smits, 2009).

The labour market position of the parents may differ and this affects school attainment in different way. The parent's position may be on hired job, personal small business or farming. In districts where agriculture is a major sector children are less likely to pursue further education

since most available jobs require little education (Colclough et al., 2000; Buchmann & Brakewood, 2000; Tansel 2002; Smits & Gunduz-Hosgor, 2006, cited in Huisman and Smits, 2009).

Children who have a parent on paid employment may more likely go to school, while those who have personal business or work on farming may less likely attend school (Psacharopoulos and Arriagada, 1987).

II. Household Structure

Apart from the economic and education characteristics of the parents, the demographic structure of the household might influence educational attainment. That is who the household head is, who makes the decision in the household, who the source of income is, the kind of relationship that exists between the members of the household, number of children in the household, the number of siblings. These factors can play a role in the decision of child's schooling.

Though there are different conclusions, many of the literatures suggest that when the household head is the mother the children are likely to attend school and are less probable to drop out of school; especially girls will remain more in school (Ibrahim et al, 2008). When the child is raised by the immediate family, Father, mother or both the probability of child's dropping out might decrease. Employment of the mother might increase her power and her say within the household and this may in turn increase the children's chances to stay in school, though there are controversies in child outcome (Huang, 2003).

The number of children and siblings in the household may have two effects. According to some literatures if there are more children and siblings on the household it will be difficult for the household to send their children to school because they will consume a lot of resources and the

household will devote less time and resources for each child. On the other hand some literatures argue that when the number of children and siblings increases there may be many hands in the household, which can increase the chance that at least some children can stay in school (Niall O'Higgins et al, 2008; Huang, 2003; Huisman and Smits, 2009).

III. Child's characteristics

1. Child's age/ marriage and adulthood

Child's age is one factor that can have an effect on school attainment. Different studies have suggested that age of the child will determine whether the child has started school on time or over age (Rose and Al-Samarrai, 1997, Sedlacek et. al, 2000). It also affects the learning ability which in turn affects the decision of school attendance. In relation to that marriage and early adulthood which are a function of child's age, may also affect school attendance (Rose and Al-Samarrai, 1997, Sedlacek et. al, 2000).

2. Gender/ pregnancy for girls

The gender of the child has an effect on sending the child to school or not. Various studies have come up with a conclusion that parents usually prefer to invest in schooling on boys than girls (Tassew et al, 2010; Bilquees and Saqib, 2004; Nakpodia, 2005).

This may be because parents think that girls when they marry will leave their parents and this makes the return from investing in that child lower. Even when they are at school girls are more volatile for any challenges and discomforts. They require safer environment which is free from any abuses. The other challenge regarding girls' education is related to early pregnancy (Cardoso and Verner, 2007), which may affect the psychology of both the child and her parents and force her to drop out of school.



3. Health

The health status of the child, in many literatures, found to be one of the factors that can affect the decision to stay or stay away from school. The nutritional content affects the child's ability especially in the long run (Milcent, et al, 2003). A hungry child will not be expected to think of the education rather the hunger he/she is feeling, so do a sick child. Hence as the literatures suggest there is expected to be a positive relationship between the health and nutritional status and child's school performance and attainment.

4. Disability and special educational needs

There are children's which are naturally disabled that demand special education needs. The availability of special treatment for the disabled will help the children to stay in school. Otherwise in the normal school environment they may face a psychological challenge and may not get the required amount of education which may affect the performance and satisfaction of the students which in turn may affect their school attendance leads to dropout.

5. Grade repetition, Low achievement and absenteeism

When a child repeat a given class or gets a low achievement and/or registered very high absenteeism the child may decide to leave school (Rose and Al-Samarrai, 1997; Andre, 2008). There are a lot of reasons for the children's low performance which lead to repeating a grade level or the existence of high absenteeism which by themselves are interrelated. There are many literatures that assure the relationship of these factors to children's decision to attend school.

6. Late enrolment

Late enrollment also affects the decision of school attendance many ways. Children who begin schooling beyond the official age of entry are more likely to quit school and less likely to stay in

school when they are compared to children who attained school at the official age of entry. (Rose and Al-Samarrai,1997). According to many literatures when children's age increases the responsibility they take care on the household increases which affect the decision to stay at school.

IV. Supply side factors: Push out factors

1. School resource, facilities and teacher student ratio

Both quantity and quality of school may be important factors in determining school attendance. There should be access to schools to talk about school attendance in the first place hence access is a factor that affects attendance. Quality is also important it determines to what extent children benefit from going to school. Good school quality has been found to have a positive impact on the decision to stay in school (Hanushek et.al, 2006; Chishti et.al, 2009; Pal, 2004).

School resources, facilities teacher student ratio are one among the supply side factors that can play a role in pulling and holding the child to school (Tietjen, 1998; Huisman and Smits, 2009). They may indicate the quality of the school in many ways. As more resources and facilities are available in the school the students will have access to those resources and facilities freely which may positively contributes for student's performance, school attendance and negatively to dropout. When the student teacher ratio increases the students will get their teacher in any time when need arises. And the teacher can monitor his students closely; can listen to their problems even apart from academics. This can help improve the performance of the students and will be an incentive to stay in school.

The class size can also influence child's school attendance and also attainment, if the class is too crowded it is unquestionable that it creates a discomfort. These discomforts will lead the child to



prefer their home than to be in class. Also the distance to school may have an impact on both school attendance and attainment negatively.

2. School environment , safety and school distance

School environment, safety and school distance from residence may influence children school attendance. The school environment must be an environment that can inspire the student to learn. Even the surrounding area shouldn't be expected to be noisy and destructive (Standard by MOE, 2007/08). On top of that the safety issue is also the other factor which can influence attainment in relation with school distance. Because as the school become too distant especially in rural areas there will be a question of safety (Ibrahim et al, 2008; Bilquees and Saqib, 2004).

School distance may also be related probably to transportation cost attached to the long distance or the availability of conducive means of transportation (Huisman and Smits, 2009; Chine et.al, 2006).

Good school environment and safety may affect school attainment positively. This may be because the parents feel secured and safe, especially for girls. If the school environment is not good and safe the parents may prefer their children to stay at home.

V. Migration

Several studies on children's welfare and migration have emphasized the positive effects of migration on children's out comes deriving from the increase of economic resources to be invested in the accumulation of human capital. However, the positive income effects stemming from migrants earnings are not without costs especially in the long run, if children remain without parents for a long time during their development .The absence of parents may entail psychological costs and change the decision-making process within the household, implying

modification of intra-house hold duties and responsibilities, and possibly inducing children of migrants to spend less time in school related activities. Children may end up dropping out of school or being held back one or more grades due to non completion or unsatisfactory completion of their educational formation (Giannelli and Mangiavacchi, 2010).

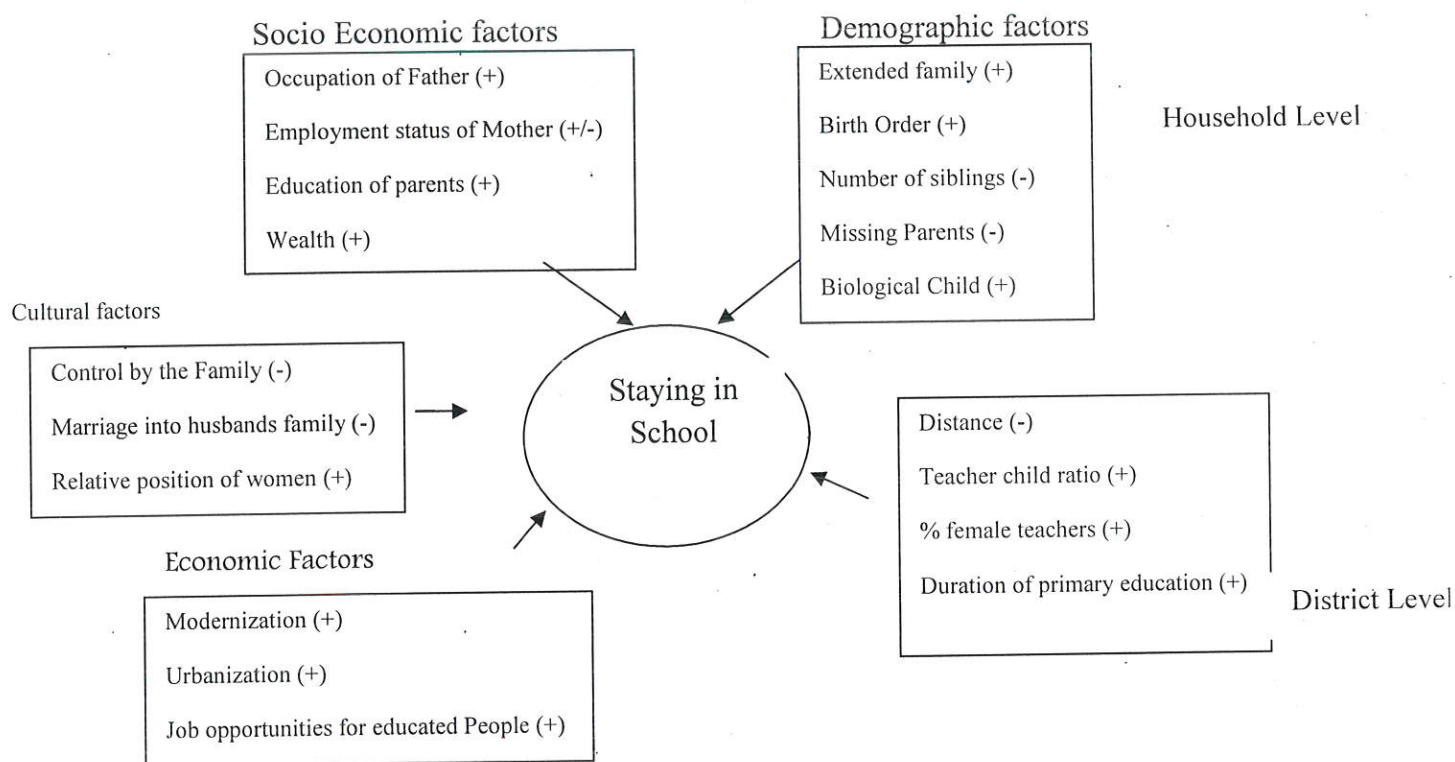
2.1.3. Theoretical models of school attendance

The standard economic approach to the decision of educating a child relies heavily on Becker's (1965) classical work. Education arises as a result of a utility maximization problem, whose solution is a function of the household production function and the family investment function. The optimal level of education equates marginal benefits with marginal costs. So with perfect capital markets, parents act as if they face a perfectly elastic supply of funds to finance education, implying that family economic resources should not be relevant in the determination of educational attendance (Becker, 1965). Consequently with this framework, any observed difference in education between two children should be associated to factors other than family financial resources. In general terms, these "other factors" reflect economic, demographic, psychological and social restrictions faced by the family who makes the schooling decision, and the different social, demographic and cultural characteristics that define the way in which different educational alternatives are evaluated against each other through the family utility function.

In these so called household production models, Education improves "child quality", and its demand is jointly determined with other household decisions regarding labor supply, the number of children, and consumption of other commodities (e.g. nutrition, housing, health and leisure). Becker and Lewis (1973) posit that the shadow price of children with respect to their number (i.e., the cost of an additional child, holding quality constant) is greater the higher the quality.

Along similar reasoning, the shadow price of children with respect to their quality (i.e., the cost of a unit increase in quality, holding the number of children constant) is greater, the larger the number of children. In other words, an increase in child quality is more expensive if there are more children because the increase has to be applied to more units. Hence it is expected that a change in one or more of the exogenous variables, holding, the others constant, would entail a change in children's schooling as a result of price and income effects.

Huisman and Smits, (2009) in their study tried to give analytical model on the determinants of schooling and the choice to stay in school. They assumed that the direct and opportunity costs of going to school and the value attached to education by parents and children are influenced by many factors both at the level of the household and the context in which the household is situated parents' schooling level and work situation might influence the degree to which schooling is valued in the household the number and gender of the children in the household might influence the distribution of scarce resources available for education among them. The quantity and quality of the local educational facilities determine whether it is possible and makes sense to go to school. The local labor market structure affects the perceived benefits of education. Cultural practices like marriage, traditions may influence the returns to education of daughters versus sons.etc. These examples make clear that educational participation of children in developing countries might be influenced by many factors at different levels of aggregation. Because these factors are not independent of each other and may exert their influence at the same time, insight into their relative importance can only be obtained if they are studied simultaneously. The figure shows the different group of factors that are included in the analytical model and their expected direction (Huisman and Smits, 2009).



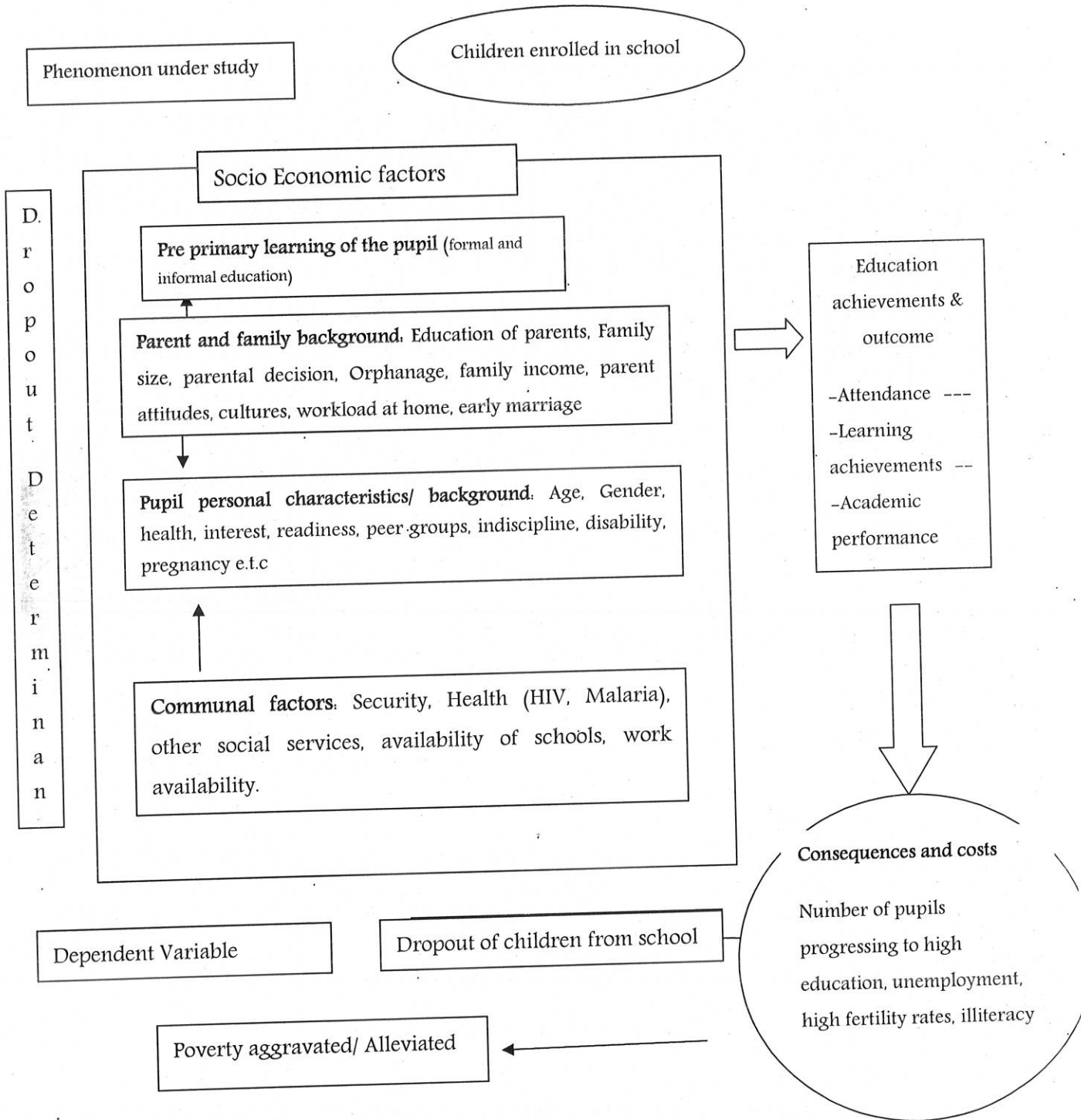
Source: Huisman and Smits, 2009

In another work, Ibrahim et al (2008) tried to conceptualize the different determinants of schooling. The conceptual model explains the school attainment of students over a given period of time reflects the impact of various socioeconomic factors, originating from the community and homes/families of the pupil, the pupil's family back ground, pupil's personality and community based factors. Socio economic variables influence the grade attainment of students directly by influencing the pupil's decision to drop out from school, or that of the parent to the decision between attendance and withdrawal of the students from schooling. The variables also indirectly influence the grade attainment of students by negatively affecting their education achievements in school.

This conceptualization highlights the complexity of factors influencing schooling of children; most variables are interrelated and influence each other. Some of the variables influence



schooling directly and indirectly through their impact on the school achievement of the children. They tried to show the various determinants and their complexity in the diagram below (Ibrahim et.al 2008).



Source: Okumu, Ibrahim M., Nakajjo, Alexand Isoke, Doreen (2008)

In another work done by Dostie and Jayaraman (2003), they tried to make the analytical frame work in the analysis of school attendance by considering a simple model in which the school attendance decision depends on whether or not the net benefit of so doing is positive. Standard models of school attendance argue that, given school quality, this depends on individual and household characteristics. Let $s_i \in \{0, 1\}$ denote the school attendance decision of individual i , and let Z_i be a vector of individual and household characteristics. Then, if b^s denotes the net benefit associated with the school attendance decision one makes, according to the standard model:

$$S_i = 1 \text{ if } b^1(Z_i) > b^0(Z_i) \\ 0 \text{ if } b^1(Z_i) \leq b^0(Z_i)$$

In words, a child attends school if the net benefit of school attendance, given individual and household characteristics, is greater than that of not attending school, and does not attend school otherwise. They also added another variable which may have an influence on school attendance, that is, in addition to Z_i , they supposed village level characteristics had an influence on the net benefit to school attendance. They simplified their notation by letting $b^s(Z_i) = b_i^s$. Suppose that the benefits of school attendance can be either high ($b_i^1 = b_i^{1H}$) or low ($b_i = b_i^{1L} < b_i^{1H}$).

Let v denote these village-level characteristics—contextual effects—and let $\phi(v) \in [0, 1]$ be the probability that attending school will yield high returns. Then, the school attendance decision equation will be rewritten as:

$$S_i = 1 \text{ if } \phi(v) b_i^{1H} + (1 - \phi(v)) b_i^{1L} > b_i^0 \\ 0 \text{ if } \phi(v) b_i^{1H} + (1 - \phi(v)) b_i^{1L} \leq b_i^0$$

The left hand side of the inequality denotes the expected net benefit of school attendance. Since $b_i^H > b_i^L$, a child will be more(less) likely to attend school if $\phi_v > 0$ ($\phi_v < 0$). They concluded that

as long as the village or contextual setting of the village gives a positive reward to schooling that a child will more likely to attend school (Dostie and Jayaraman, 2003).

2.2. Empirical Literature

There exists a myriad of reasons as to why parents do or do not send their children to school. Although the findings of various studies differ depending on the peculiar country specific situations but rural-urban divide, gender bias, and distance to school appear to be the most common elements in all the studies (Bilquees and Saqib, 2004; Ibrahim et al, 2008). In this section the researcher reviews the various literatures with their empirical findings.

2.2.1. Economic status and Household Structure

Various literatures have identified the economic status and the structure of the house hold to have a significant effect on the likelihood of school attendance and child schooling in general especially in the developing countries.

The study in Pakistan by Holmes (1999) for instance, examined the determinants of school attainment of children and “censoring” and “sample selection” bias for boys and girls separately by using censored ordered probit model. She finds household wealth is a major factor in determining children's schooling and its influence is greater for females (Holmes, 1999).

She further found that parental education is a significant determinant of both boys' and girls' schooling, with mother's education exerting a larger impact on daughters' education and father's education influencing more heavily the schooling of sons.

A panel data generated by the Pakistan Socio-economic Survey (PSES) supplemented by logit regression analysis was conducted by Bilquees and Saqib (2004). They found that mother's education at all levels significantly increases female schooling and reduces their dropouts,

particularly in the urban areas; While, Father's education is not very significant in increasing female schooling in rural areas. In addition, household consumption expenditure, which is used as a proxy for the permanent household income, turns out to be insignificant for child schooling decision (Bilquees and Saqib, 2004). Another study by Chishti et.al, in Pakistan however showed that the financial constraint of the households found to be a significant factor (Chishti et.al, 2009).

These highlights that there are somehow mixed findings regarding household's financial matters in determining child schooling in Pakistan. For instance, Bilquees and Saqib, (2004) found household's economic status matters little as far as children school attendance and grade attainment is considered. They further argue that although there seems to be a consensus about the positive role of household income in determining other educational outcomes, this does not appear to be the case for dropout rates.

Jayachandran (2002) in India conducted a panel data analysis on exploring the socio economic determinants of schooling by using random effect model with a special emphasis on girls education. Parental education, accessibility of school, poverty, and household size found to be significant in influencing school attendance of children in different direction. Where, the former two variables positively affect children school attendance and the latter two negatively. In addition he, interestingly, found a positive association between women's labour-force participation and children's school attendance.

By analyzing the determinants of school participation, grade attainment and literacy rate among 24, 000 children aged 7-14, show that the availability of household resources increases the probability that one is enrolled while the necessity for a child to work increases fivefold the dropout probability. Other things being equal, offspring of farmers attain about one grade less

relative to the rest. In addition, once a child is enrolled in school, the strongest predictor on his/her grade attendance is parental occupation (Psacharopoulos and Arriagada, 1987).

In line with the above result Sedlacek et. al (2000) found that there is a significant positive relationship between a father becoming unemployed and a child beginning to work in domestic labor. There was also a positive correlation between father becoming unemployed and a child dropping out and repeating a grade. Empirically, a child whose father income becomes zero will likely dropout of school by odds of 1.23. The education level of both parents and father's income are all important determinants of child paid, domestic labour and dropout where education of parents and father's income affects school attendance of children positively (ibid).

Cardoso and Verner (2007) also analyzed early parenthood, child labour and poverty in urban Brazil Based on IV estimation technique. In their finding they indicated that early parenthood has a strong impact driving teenagers out of school. Extreme poverty is another factor lowering school attendance, as children who have suffered hunger at some point in their lives are less likely to be found attending school (ibid).

In Argentina Escudero and marchionni (1999), by employing a logit model found that for a child of a given age, income and parents education play a key and positive role on schooling, which goes in line with other findings (Maitra, 2001). Regarding woman headship, which exists more or less a mixed result, the paper found an interesting result. The fact that being under the woman head by itself don't increase the likelihood of children schooling rather, when it is faced with additional resources, women heads assign a larger part of this increment to education than men would do.

While Dumas and Lambert (2005), confirmed that in Senegal there exists a positive effect of having a father educated for enrollment and for the level attained of children. The paper further



argues that the estimated effect of father's education more than doubles when its endogeneity is accounted for and also a positive effect of mother education and wealth on level attained. And they further concluded that an unfavorable background affects the path of children as much once s/he has entered school than it does before entry.

By employing a logit model also Ibrahim et.al (2008) found that the gender of household was insignificant across all the models except for age cohort 5-8 and age and cohort 9-12 years for girls only. This finding is contrary to the general belief that children of female headed households are more likely to attend school. In Uganda also, the gender of the household found to be insignificant and female headed households makes no difference on child's school attendance and attainment (ibid).

Household head's age and the proportion of economically active members in the household have also found to be significant, when both variables increases the probability of children to attend school will increase and drop out of school decreases. The size of the household also found to be significant; children in larger households are more likely to be in school than children living in smaller household. This may be attributed to the fact that the other household members can substitute to or share child labour (Ibrahim et.al, 2008).

Sackey (2007) employed a gender disaggregated probit models on current school attendance and ordered probit model for attainment from 1992 and 1999 to show that parental education and household resources are significant determinants of schooling in Ghana. She further argues that the effect of household resources on current school attendance is higher for daughters than it is for sons. Though mothers' and fathers' education and higher financial resources for all age groups and for both girls and boys, increases school attendance it appears that for male and female children the impact of household resources on school attendance has reduced, statistically

speaking. Father's schooling effects on the education of female children decreased between 1992 and 1999 but; Mother's schooling effects on school attendance of daughters in 1992 were not significantly different from those realized in 1999 which is similar with other findings (Sackey, 2007). Household level of wealth, mother's autonomy (for girls only), parents' education and percentage of mothers in white-collar jobs (for girls only) influence both school attendance and attainment of children's positively in Egypt also (El Daw A. and Safaa E.,2002).

In Nigeria it is found that child living with other relations reduces the probability of child participation in school compared with when a child is living with both parents. The educational status of parents is not only significant but also positive to child schooling compared with illiterate parents. However, father's education has more impact on child schooling than mother's education as explained by its marginal effects. Household welfare status (asset index) has a positive significant effect on probability of child schooling. The result also shows that a unit increase in household wealth marginally increases the probability of schooling by 2% (Chine et.al, 2006). In the same manner Lincove (2009) found that Cost of schooling by itself was not a significant obstacle for schooling however; Controlling for costs, household wealth has a large, positive effect on primary school attendance with greater income elasticity for girls than boys (Lincove, 2009). This affirms that Wealth plays a significant role in determining schooling.

Pal (2004) analyzed child schooling and school progression in Peruvian children of aged 10-20. Both at primary/secondary level crucially depend on whether children have educated parents and more siblings in the working age category (Pal, 2004). The level of Education of parents also found to be significant at all school levels in determining school attendance in Albania (Giannelli and Lucia, 2010). Parent's educational status is not by itself an end it also creates biasness between girls and boys education in Kathua Tehsil district for instance they did not give much

importance to the education of girls as they did to their sons this is because, they perceived that estimations and sons support them in their old age (Kotwal et.al, 2007).

By taking 30 developing countries Huisman and Smits (2009) come up with a conclusion that is consistent with the above results, parental education, father's occupation and household wealth show the expected positive effects on staying in school with the effect of mother's education and father having at least some primary education being stronger for girls. Unlike this finding, in Pakistan, the effect of father's education has stronger influence on boy's not girls (Holmes, 1999). However they found that the coefficient for mother's employment is not significant (Huisman and Smits, 2009).

In the developed countries the findings regarding wealth and family status is more or less the same from the above results. In Michigan, for instance, a mother's work exhibited a positive and significant association with her child's educational out comes. However results from fixed effect outcomes show children of working mothers exhibited statistically no difference in educational achievements compared with children whose mothers did not work. In addition to that children from single parents substantially had lower achievement (Huang, 2003).

Based on the data derived on the British household panel study conducted on young people's educational attainment; apparently they found that parental educational attainment is very powerful predictors of their child's educational attainment. Similarly, young adults who experience single parenthood as children and those who come from families in the bottom income quartile have significantly lower educational attainment (Ermisch and Francesconi, 2000).

2.2.2. Child's characteristics

Characteristics of the child by itself affect school attendance, attainment and the probability of dropout from school. In their study in Egypt Hanushek et al. (2006) found that higher-skilled individuals—children with greater achievement tend to be the ones who stay in school while, lower-skilled individuals tend to leave school early. The paper underlined that the most significant predictor of children's dropout and low attendance is the grade failure/repetition, in addition to age, and cost of education per pupil in the community (for boys only), (ibid). Sackey (2007) in her finding also emphasized the most significant determinant of children's schooling in Ghana is the age of children. In fact the other significant determinants are school infrastructure, religion and urban residency which are consistent with other works.

Andre (2008) estimated various specifications of the probit model, to find the determinants of grade repetition by employing IV estimation for the expected endogeneity to analyze the link between grade repetition and schooling. The estimated effect of grade repetition on school dropout found to be significant and negative. Though teacher's attitude may also be correlated with other educational methods, the teacher's attitude towards repetition is likely to have direct effect on school attendance of children (Andre, 2008).

Sedlacek et al (2000) found that both gender and age were highly significant with boys and older children being less likely to attend school and more likely to work, drop-out and repeat grades. Nakpodia (2005) also found that at varying degrees the dropout rate was higher among boys (Male) than girls (female) that implies boys are more likely to attend school than girls. In line with other findings in Pakistan Female students' dropout rate is higher in rural area than male students (Bilquees and Saqib, 2004). In Uganda, however, (Ibrahim et al, 2008) gender of the child were found to be insignificant in determining schooling.

Chine et.al. (2006) by using univariate probit model come up with a result that female children are more disadvantaged in attending school compared with their male counterpart in Nigeria, which goes in line with the other findings. This may be the problem associated with opportunity cost of training of female child in school to that of male child. The age of the child also determines the probability of child schooling (ibid).

Starting school at the official starting age of seven years and not repeating a grade increases the chances of completion. Starting school above the official age and repeating a grade are also shown to reduce the chances of girls completing school by a slightly greater amount than boys in Ethiopia (Rose and Al-Samarrai, 1997).

To analyze the causes of school dropout based on the data from the "school dropout survey" undertaken in Salerno Province, Southern Italy and by using a two equation probit model, in southern Italy being the first born is negatively correlated with leaving school (O'Higgins et al, 2008). The number of younger children in the household has a negative impact on the schooling of their elders in Brazil (Psacharopoulos and Arriagada, 1987). In Michigan however, the number of siblings and location has no significant impact on child's educational attainment (Huang, 2003).

School attendance will be lower with high dropout rate; if the mother or father is missing, if there are more brothers and if the mother got her first child below age 18. The probability of school attendance are higher and dropout rates are lower for children in extended families (where by the effect in extended families without grandparents is stronger for boys) biological children and later born children. The number of sisters and mother's employment however found insignificant in determining child schooling (Huisman and Smits, 2009).

2.2.3. Child Labour

Cardoso and Verner (2007) found that in particular to urban context, working does not necessarily have a detrimental effect on school attendance. Dropping out of school leads most often to inactivity, and not to work, which could be due to the lack of employment opportunities. Another possible reasoning points to the role that working for some hours can have helping fund schooling. Indeed, costs such as daily transportation are often pointed out in interviews as obstacle to progress beyond a certain point in school (ibid).

In Peru also higher labour market participation does not necessarily adversely affects school attainment at primary/secondary level, but only at the post-secondary level, perhaps reflecting the flexibility of part-time employment in Peru (Pal, 2004).

In Brazil, mother's education seems to have a positive effect in schooling and health, and, moreover, more educated mothers are more conscious about negative effects of child work in their future life. The child participation in labor market is also influenced by the kind of mother's occupation. Self-employment and non-remunerated occupations create incentives to child labor. They also found that child's labor and school attendance have a very strong correlation and School attendance has a negative impact in child's probability to participate in labor market. Another work in Brazil shows that the necessity for a child to work increases fivefold the dropout probability (Psacharopoulos and Arriagada, 1987).

2.2.4. School side factors

The paper has employed the method of output based school quality technique estimated with maximum likelihood technique. With the student's own ability and achievement held constant, a student is much less likely to remain in school if attending a low-quality school rather than a

high-quality school (Hanushek et al, 2006). They further argue that with the individual's own ability and achievement held constant, a student attending a higher quality school will tend to stay in school and a student attending a lower-quality school is more likely to dropout and complete fewer grades. Students appear to recognize quality differences and act on them.

The study by El Daw and safaa(2002) found the Link between quality and school attendance/ dropout reveals that quality matter and that quality of education in private schools is much better than in public and religious schools. Access to private lessons significantly reduces the likelihood of failure and repetition. However, it is only the students of the rich who have the privilege of attending private schools and they are more likely to have access to private lessons (ibid).

By analyzing the view of parents and teachers Chishti et.al (2009) concluded that parents send their children to private schools for quality education, because they think that private schools are better in quality than public schools and teachers in public sector show less interest in education, so parents shift their children to private schools. Teachers however are in the view that private schools provide more facilities while there is lack of facilities in public schools which are necessary for quality education. They also found that dropout rate is to be higher in the rural areas. There is also clear evidence that shows school quality determining school progression and attendance decision of children in Peru (Pal, 2004).

An interesting finding from Huisman and Smits, (2009) shows that children have a higher likelihood to stay in school if the teacher child ratio or the percentage of female teachers is higher and these effects are stronger for girls than boys though it will lose its significance in multivariate estimation

In Pakistan majority of educational resources are earmarked for improving access to primary schools. Long distance to school is also another common factor forcing pupils to drop out of schools in Pakistan. Given that Holmes (1999) found distance to primary school does not affect one's attainment whereas distances to middle and secondary schools are significant determinants of final schooling level (Holmes, 1999). Bilquees and Us Saqib (2004) explained about long distance as a determinant factor in Pakistan by differentiating between rural and urban areas. They further argued that, in urban areas, where means of transportation are generally well developed and safety of environment is more conducive to long walks or rides to schools, this factor is less likely to influence the decision to drop out. However, in rural areas roads and public transport are usually less developed and long travel, particularly out of the village is not considered as safe as travel to a comparable distance in urban areas.

The study in Nigeria shows, the probability of child schooling increases when the school is close to the child. In quantitative terms, the result shows that the probability of child schooling increases by 8% when school is close to the child's vicinity. This result probably may suggest that going to school in distant location outside the child's environment could involve further cost to the household, especially transportation cost, which some poor households may not be able to afford. Children located in rural areas are less likely to be in school compared to their urban counter party (Chine et.al, 2006). In line with that Huisman and Smits (2009) found, Girls in rural areas of districts with a higher average distance to school are less likely to stay in school.

A student attendance of primary school decreases with increase in the distance a child moves to school. Children traveling long distances to school are more likely to drop out of school (Ibrahim et al, 2008). Whereas, distance was found to be insignificant in influencing dropout for urban households, it is generally significant in rural areas except for girls (Ibrahim et al, 2008).

2.2.5. Other Context factors

There are many other factors that can affect children schooling. Wages are found to affect schooling outcomes, although the direction of the effect is unclear. Higher wages imply greater resources for current education expenditure as well as higher expected future earnings, thus increasing the demand for child schooling. On the other hand, higher wage rates may lead parents to substitute their time away from home to the labor market, reducing the complementarities of children's home and school learning, and thereby lowering children's final attainment. If higher wages are also paid to young workers, children may be pulled to enter to the labor market at earlier ages, further depressing final school attainment, Holmes (1999). In Southern Italy, a larger local labour market also has a positive impact on the decision to permanently dropout of school (O'Higgins et al, 2008).

The availability of white collar jobs, as indicated by the percentage of men with such an occupation, found that it significantly increases both boys' and girls' likelihood of staying in school in 30 developing countries (Huisman and Smits, 2009).

In Pakistan, Having no sewage disposal system in the community is significantly associated with less schooling (Holmes, 1999). In Brazil also, all physical resources available to the household have a positive participation. However, the presence of piped water is the strongest predictor of school enrollment among them (Psacharopoulos and Arriagada, 1987).

Being Muslim also significantly increases final attainment of boys, relative to adhering to Christianity or other religious beliefs (Holmes, 1999). In Albania father's migration abroad negatively influences children's schooling in the long run, increasing the probability of dropping out and of delaying school progression (Giannelli and Mangiavacchi, 2010).

In Albania also household's social capital is relevant at all school levels in increasing the probability of school attendance (ibid).

2.2.6. The case in Ethiopia

In Ethiopia like other findings above, wealth and parent status have a significant effect on child schooling (Tassew et.al, 2010, Orkin, 2011, Rose, 2003). By employing a cox box proportional hazard model Tassew et.al (2010) found that years of schooling of both parents significantly and negatively affect the probability of their children dropping out of school. The number of negative shocks experienced by a household was also found to have a significant and negative effect on child dropouts (ibid). They further argued that social capital may be one of a significant variable which may determine child's school attainment. For instance, overall Social capital of the parents found to be significant only for the duration of schooling however participating in any social organization and feeling of belongingness in ones community is found to be insignificant on children's school completion. Like other studies, in Ethiopia also, the probability of a child dropping out of school increases as the distance to the nearest private or public school increases, which lowers school attendance of children.

Kassahun(2006) by employing the same methodology found that education of the household has a significant impact in reducing the dropout rate for both boys and girls and as family size increases school dropout rate decreases for both females and males, children from female headed households have a higher probability to stay in school than male headed household and he further showed that there exists wider gaps between rural and urban areas, hence there exists regional variation; for instance, dropout rate is high in SNNPR (14.3%) followed by Oromia (10.2) (Kassahun, 2006). Younger siblings in Ethiopia also found to be more likely to attend school and less likely to dropout (ibid).

The data set used in this paper by Rose and Al-Samarrai (1997) was collected during fieldwork carried out in Ethiopia in 1995, in East Gojjam zone (Amhara region) and Jimma zone (Oromiya region). Bivariate and multivariate analysis has been carried out to identify some of the important constraints to primary schooling. In the multivariate analysis two logistic regressions were run. In line with other findings, Children from wealthier households whose mother and father are literate are found to more likely attend and complete primary school (Rose and Al-Samarrai, 1997).

Another study conducted in Ethiopia attempts to deal about parental attitudes towards formal education in rural Ethiopia using ERHS. Unlike the other neither findings, neither income (measured by consumption per adult equivalent) nor land holdings per capita were highly significant in explaining attitudes. Older fathers have positive attitude towards schooling from economic point of view (Weir, 2010).

Tietjen (1998) used a household survey and accordingly, Economic constraints clearly represent the most salient impediments to participation and persistence in primary school in the rural areas. Specific school expenses were also identified as difficult for rural parents to manage for instance; Clothing costs were mentioned as particularly exacting by over 36 percent of the households, school books were also cited as burdensome by nearly 30 percent of the sample. In addition to the financial constraint, the demands of seasonal agricultural practices appeared to play a significant role in parental decisions to withdraw children from school, on both a temporary and a permanent basis (Tietjen, 1998).

In Ethiopia also, child's gender has found to have a significant effect on primary school attendance, with boys less likely to dropout than girls and more likely attend school. Children's age has a significant and positive effect on the probability of attending school where older

children found to be more likely to dropout (Kassahun, 2006). He also found that males have higher dropout rates than females, unlike Tassew's et al, findings that the dropout rates are higher among girls than boys in primary education (Tassew et al, 2010).

Unlike the findings Pal (2004), in Ethiopia supply factors, Class room (section) teacher ratio, student teacher ratio and per student school expenditure, had weak, but significant, effects on the level of household demand for primary schooling, These weak correlations may well indicate that parents are largely unconcerned about school quality issues in light of the economic and financial barrier they must confront in deciding whether to send their child to school or not (Tietjen, 1998).



CHAPTER THREE

MODEL SPECIFICATION AND ESTIMATION METHODS

3.1. Analytical Frame work

The most prominent micro economic model that is commonly used as a spring board in works related to schooling is the model developed by Becker (1964, 1965). This model explains a household production model which defines a utility function of a household to be maximized subject to resource constraint and has been used extensively since then. Consistent with the quality–quantity trade-off models, the household is assumed to maximize a twice differentiable utility function subject to its production functions, and budget and time constraints. In extension Becker's (1981) model which is more or less similar in content with the previous model and Mincer (1958), altruistic parents maximize household utility for which quantity and quality of children, leisure, and market goods are arguments. Hanushek et al. (2006) affirms that in developing countries, regarding the choice on young children going to school parents are expected to have a large say. They are expected to make a comparison between current costs and the future benefit, and give weigh.

Accordingly, the arguments in the utility function are home produced goods i.e. the number of children n , quality of children; which is represented by child schooling S , leisure L and consumption of market goods C , and they maximize household welfare function subject to child production function constraint and budget constraint.

$$U = U(n, S, L, C ; X_h) \quad (1)$$

Where, X_h is a vector of household characteristics where some of which may be unobservable. since education improves child quality, the child quality production function could be interpreted

as being a function of the time children spend in school, the household expenditures on education, and environmental factors that may have a direct impact on child schooling.

$$S_i = F(R, X_i, X_c, X_h, X_s, \mu), \quad (2)$$

Where R is a vector of inputs such as resources allocated to the child for school attendance, time spent by parents; X_i is a vector of community level characteristics, X_c is a vector of child characteristics such as age and gender, X_s defining school side factors and μ summarizing all unobservable characteristics of the child, parents, household, community. In addition, the choices of the households are assumed to be limited by their full income restraint. The Household budget constraint is given by,

$$P_c C + P_s S + WL = V + Y \text{ (FI)} \quad (3)$$

Where, Where P_c , shows the prices of vectors of consumption goods, P_s denotes the price of schooling, which may represent educational inputs such as books, tuition fee. And FI is the full income which includes V the non-labour income of the household; Y is the income from all other sources.

Solving the household's optimization problem gives a set of demand functions for child quality, number of children, leisure and consumption goods. In this framework, the reduced form function for the i^{th} child quality, the demand for schooling outcome is given by:

$$S = f(X_i, X_c, X_h, X_s, \mu, W, P_s, P_c, Y) \quad (4)$$

Two different version of equation (4) will be estimated.

3.2. Data Sources

The data set used for this study is the Ethiopian Rural Household survey conducted by the Department of Economics, Addis Ababa University, in collaboration with the Centre for the

Study of African Economies (CSAE), university of Oxford and the International Food Policy Research Institute (IFPRI). These surveys are conducted in seven rounds during the years 1994a, 1994b, 1995, 1997, 1999, 2004 and 2009. The first four rounds of ERHS covered a sample of 1,477 households in eighteen Peasant associations (villages) spanning 15 Woredas (districts) in six regions, namely: Haresaw, Geblen, Dinki, Debre Berhan, Yetmen, Shumsha, Sirbana Godeti, Adele Keke, Korodegaga, Turfe Kechemane, Imdibir, Aze Deboa, Addado, Gara Godo and Doma. Additional three villages were included in the fifth (1999) and six (2004) rounds, increasing the number of villages to 18 and, households to 1681. For the consumption of this paper, as to reduce the computational difficulty of the limited dependent variable model that is going to be employed, the seven (2009) wave will only be used.

The sample is selected to represent the major socio-economic and demographic characteristics of the rural population. Together, the fifteen district sites provide a realistic mix of cultivation categories and standard of living strata and reflect most of the important agro-economic variations found in rural Ethiopia, though it can't be said as national representative data (Stefan D. et.al, 2007). The survey includes information on household demographics, income, consumption, employment, education, facilities and other household socio-economic variables.

3.3. Specification of the Empirical Model and Estimation Methods

In the econometric estimation the dependent variable is the educational attainment of children, which is a measure of demand for schooling. In such economic contexts where the dependent variable is a binary or ordered response, unlike the classical regression model, the response variable is discrete or discrete-continuous where the distribution places probability mass at nonnegative integer values only (Wooldridge, 2002).

Given the discrete or ordered and nonnegative nature of the dependent variable, educational attainment, the OLS model is obviously inappropriate as the conditional mean it specifies, $x'_{i}\beta$, may take negative values.

Educational attainment here is examined using two dependent variables: current school enrolment and the highest level of schooling (or highest grade) completed. For both binary and ordered responses, linear models exhibit different shortcomings. First in the analysis of binary responses if β is the OLS estimator, there usually be values of x such that $0 < x'_{i}\beta < 1$. Because the linear model implies that $x'_{i}\beta$ is a probability and should lie between 0 and 1. This is only possible if the x values are bounded and if certain restrictions on β are satisfied. Usually this is hard to achieve in practice. In addition to this fundamental problem, the error term has a highly non-normal distribution and suffers from heteroskedasticity. Because y has only two possible outcomes (0 or 1), the error term, for a given value of x_i , has two possible outcomes as well. In addition, the variance of the error term is not constant but dependent upon the explanatory variables (Wooldridge, 2002). Hence Analysis of the current level of enrolment is fairly standard and is conducted using a probit model.

Estimation of the highest level of schooling completed is however more complicated. Surveys typically measure schooling attained by the years of education attained (or the highest class completed). This leads to several problems. First, even though desired schooling might be a continuous variable, the researcher only observes discrete years of schooling. Second, data on education attainment from developing countries is often characterized by a large mass point at zero years of education and similar probability spikes at primary and secondary school completion levels, where progress to the next level is often impeded by school fees and entrance requirements. OLS estimation is therefore inappropriate under this setup. The literature has

therefore used ordered probit/logit models to estimate the highest grade attained (Tansel, 1997, Sackey, 2007). Hence an ordered probit model is therefore used for estimation purposes.

Following the work of (Tansel 1997, 2001, Sackey, 2007), the paper uses two alternative measures of educational attainment: Current school enrolment and the highest grade completed. Current school enrolment is a dichotomous indicator variable and is estimated using a probit model. As this is a binary outcome, we use maximum-likelihood to estimate a bivariate probit model. Since utility is not directly measurable and the decision to send children to school depends on the utility the parents derive, the model is constructed using the underlying latent variable model.

$$S^* = \beta X + \varepsilon$$

SCHATT= 1 if the child is currently enrolled

0 otherwise;

Where, X captures the vector of explanatory variables which are presented in table 3.1, while β denotes the set of unknown coefficients and ε is the error term.

The analysis of the highest grade completed, measured by the grade-years of schooling completed by children, is complicated by the problems of discreteness of the completed years of schooling and the problem of probability spikes. Based on Tansel (1997) and Sackey (2007), an ordered probit model is considered to be best suited and used for estimation purposes. Hence an ordered probit approach, which is an approach that is common in empirical studies on grade obtained /completed grade level, will be employed.

As cited in Sackey (2007) the ordered probit model is developed following Bruce and Anderson (2004). The essential idea behind the ordered probit model is as follows: Define S^* as the desired

level of schooling, which is a continuous variable depending on a set of explanatory variables X and a residual term ε , assuming normally distributed error terms, the ordered probit model is given by;

$$S^* = \beta X + \varepsilon$$

In practice however we do not observe desired schooling S^* . Instead for those children, we observe a discrete level of completed education S , in this formulation S^* is a continuous unobserved variable (i.e., latent). It represents the respondent's "true" underlying educational attainment. The vector of explanatory variables is captured by x and this is presented in table 3.1, while β denotes the set of unknown coefficients is the error term. Hence the observed educational attainment is given by:

$$S = \begin{cases} 0 & \text{if } S^* \leq \mu_0 \\ 1 & \text{if } \mu_0 < S^* \leq \mu_1 \\ 2 & \text{if } \mu_1 < S^* \leq \mu_2 \\ \dots & \dots \\ J & \text{if } \mu_{j-1} < S^* \end{cases}$$

Here the μ are threshold parameters that denote transition from one schooling category to another. These threshold parameters or cut-points are to be estimated together with the vector of unknown coefficients. The researcher has defined four such categories:

$S = 0$ if no education attained

1 if highest grade completed is greater than 0 but less than (or equal to) 4.

2 if highest grade completed is greater than 4 but less than (or equal to) 8.

3 if highest grade completed is greater than 8.

Under the assumption that ε is distributed normally:

$$\Pr(S=0) = \phi(\mu_0 - \beta X) \text{ for } S=0$$

$$\Pr(S=1) = \phi(\mu_1 - \beta X) - \phi(\mu_0 - \beta X) \text{ for } S=1$$

$$\Pr(S=2) = \phi(\mu_2 - \beta X) - \phi(\mu_1 - \beta X) \text{ for } S=2$$

$$\Pr(S=3) = \phi(\mu_3 - \beta X) - \phi(\mu_2 - \beta X) \text{ for } S=3$$

3.4. Description of Variables

Most empirical studies underlie their theoretical approach regarding schooling on the human capital model; the model focused on the trade off and lack to explain more about the determinants though. Hence, in the effort to identify the most significant socio-economic determinants of schooling in a relevant way, it is better suited to amalgamate different models, conceptual or analytical frame work which is employed by others and empirical works to come up with comprehensive model that will better help understand which of the variables are in fact significant in rural Ethiopia.

Crudely speaking, based on the different theories, conceptual frameworks and empirical findings as indicated in the literature review, Parental education level, occupation of the household head, participation in income generating and off farm activity of the head, wealth status of the household, house hold headship (whether the mother or the father), marital status, household size and age of the household head will be included as parent and house hold specific variables. The number, age and gender of the child in the household, are considered as child specific variables and are major determinants of child school attainment. In addition, the availability of drinking water and/or piped water and the kind of toilet and sewage disposal available, which measures

the standard of living at the individual and community level, were also identified to influence school attainment of children. The average distance to schools also influences as to whether it is possible and makes sense to go to school (Huisman and Smits, 2009). As the study is based on the data collected in 4 regions of rural Ethiopia, which are scattered over different agro-ecological set up of the country, regional dummies are included as explanatory variables. This inclusion helps to control for important variables which are not exclusively incorporated in this study like, ethnicity, religion, culture, altitude, etc.

Table 3.1: Description of variables

Variable	Description
Dependent Variables SCHATT GRADEATTNMT	Current school attendance (1 if attends) Highest grade completed
<u>Child characteristics</u> genderCHILD AgeCHILD Age2 BioCHILD parentCHILD CHILDlabor	Gender of the child=1 if female, 0 otherwise Age in years of the child Age squared 1 if the child is a biological child 1 if the child lives with both parents Involvement of a child in labour activity, 1 if involves 0 otherwise.
<u>Parental and hh characteristics</u> Hhhead headoccupation Hhsize ageH mstatusH	The household head=1 if female, 0 otherwise Head occupation=1 if have both primary and secondary occupation, 0 otherwise Household size in number Age of the household head Marital status of the household head=1 if married, 0 otherwise The total asset value owned by the household(LS+tools)

totalassetvalue totplotsize_hec totaleduc_expense remittance incomegenactvty_12mzs bankaccownership eqqubmembership loantake hhofffarm_yr availabilitytoilet availabilitypipewat	<p>Total plot size in hectares owned by the household</p> <p>Total education expense of the household(school fee+other school expenditures)</p> <p>The household receives remittance=1 if receive, 0 otherwise</p> <p>Household involvement in income generating activity in the last 12 mzs=1 if involves, 0 otherwise.</p> <p>Household bank account ownership=1 if owns, 0 otherwise.</p> <p>Household Eqqub membership=1 if member, 0 otherwise.</p> <p>Household loan take =1 if the household takes a loan,0 otherwise</p> <p>Household involvement in off farm activities in last year=1 if involves, 0 otherwise.</p> <p>Availability of any kind of toilet in the household=1if available, 0 otherwise.</p> <p>Availability of pipe water in the household=1if available, 0 otherwise.</p>
<p><u>Community variables</u></p> <p>avedstscl accesselectricity_COM accesspipewat_COM</p>	<p>Average distance to primary school of the PA in meters.</p> <p>Access of electricity in the PA=1 if accessible, 0 otherwise.</p> <p>Access of public pipe water in the PA=1 if accessible, 0 otherwise.</p>
<p><u>Region</u></p> <p>Tigray Amhara Oromia SNNPR</p>	<p>1 if the region is Tigray, 0 otherwise.</p> <p>1 if the region is Amhara, 0 otherwise.</p> <p>1 if the region is Oromia, 0 otherwise.</p> <p>1 if the region is SNNPR, 0 otherwise.</p>



CHAPTER FOUR

DESCRIPTIVE STATISTICS AND ESTIMATION RESULTS

4.1. Descriptive Statistics

As discussed in the previous chapter, the data source of this study is the last round of the Ethiopian Rural Household Surveys (ERHS). Accordingly, the primary aim of this paper is to examine the determinants of the demand for schooling for a sample of children in rural Ethiopia. Relevant variables that determine child schooling were selected based on the theoretical framework, their importance in the empirical literature and their availability in the data set.

For the purposes of this paper, the sample is restricted to individuals aged 7-24, children in this paper are defined as those in the defined age group. The data in this age group includes a total of 3279 individuals belonging to 1565 households. When the left hand side (dependent) variable is current school enrollment, the observations are restricted to children in the age group 7-14. On the other hand when the highest grade completed is the dependent variable the reference group consists of children in the age group 12-25. Though the primary school age is 7-14, traditionally in developing countries children delay their initial enrollment and also continue to stay in school (Maitra, 2001). Hence the sample is partitioned in two cases to help examine the different aspects of schooling and educational attainment for children belonging to different age group.

According to table 4.1, about 71.8% of the primary school age children are currently attending school, while the other 28.2% comprises of children in that age group who are not currently attending school (This includes, who have been attending but has drop out and who have never been in school). There is some gender differential in current enrolment status, from children that are currently attending school 50.2% are female children while the rest 49.7 % are male children.

In terms of gender, about 50% of the children are boys with slightly greater proportions, than the girls. 82.2% of the children in the sample are biological children; in this case a biological child is defined as a child who is either the son or the daughter of the spouses. Hence the rest 17.4 % of children have other relationship to the head, but lives in the household and belongs to the specified age group. The proportion enrolled in school at the time of the survey reaches a peak around the age of 12 whereas the non attendance is higher at the early school ages of the children. Regarding child labour, whether a child participates in either domestic, farm or off farm activities, shows that over 97% of the children in the age group 7-14 participates in either or all of the activities. This figure increases to 99% when the age restriction is 12-25(refer appendix III).

Table 4.1 Summary Statistics on Gender, Current School Attendance and Biological Child

Variable	Percentage
Children who attends school currently	71.8%
Children who don't attend school	28.2%
Male child	50.02%
Female Child	49.98%
Biological children	82.2%

Source: ERHS and own computation

Moreover, in analyzing the years of schooling for children aged 12-25 as discussed in the following table, 87.5% of the children have only obtained primary education level thus far and 11% of the sample in the above age group did not complete any schooling, while only 0.5% has attained secondary level education. The rest 0.7% of the children have attained informal education. The average grade attainment of the children in the sample is 3.6: the minimum being 0 years of schooling while the maximum is grade 10. Among the whole sample in the defined

age group, 21% of children are those children who are not currently attending school and already attained some grade level. In which case the children have already completed some grade level and quitted school, however, for the rest 79%, they have completed some grade level but are still attending. This is because children in this group are currently attending school, and their grade level is assumed to be at least greater than the grade level they are attending.

Table 4.2 Summary Statistics on Grade Level of Children

Child Grade level	Percentage from the sample	Average
Average Grade Level of children in the sample		3.6
Did not complete any schooling	11.09%	
1th Grade	9%	
2nd Grade	12.5%	
3rd Grade	13.6%	
4th Grade	18.8%	
5th Grade	16.3%	
6th Grade	10.4%	
7th Grade	5.4%	
8th Grade	1.5%	
9th Grade	0.3%	
10th Grade	0.2%	
Other literacy program	0.2%	
Church/Mosque education	0.5%	

Source: own Computation and ERHS

Table 4.3 discusses about some household level characteristics and accordingly, about 85% of the household in the sample are male headed. The distribution of the household heads in terms of occupation shows that only 41.9% of the household head have both primary and secondary occupation and the rest 58.1% just participate in primary occupation. Many literatures classify

head occupation as whether the head is a farmer/domestic worker and/or participates in off farm/income generating activities; however the data in the survey shows that nearly 72% of the household heads are farmers and the rest 17% involves in domestic activity. In which about 99% of the household heads are either farmers or domestic workers as their primary job. Hence to shed some light on the impact of head's occupation on child education it is better to use the classification of head's occupation as primary only or both. From the total observation 65% of the household head in the sample are married while the rest, 35% were either single or divorced. The average age of the household head in the sample is 52.66.

Table 4.3 Summary Statistics on Age, Household Size, Number of Children and Number of Dependents (Mean maximum, minimum and standard deviation)

Variable	Mean	Min	Max
Age of the household	52.66 (15.0)	14	120
Household size	5.78 (2.58)	1	16
Number of children	2.9 (2.01)	0	10
Number of dependents	2.52 (1.88)	0	11

Source: ERHS and own computation

The average household size of the households is around 6 members in which case the maximum size is registered to be 16. In line with this the average numbers of children in the household are nearly three children. While the average number of dependents in the household, individuals whose age is below 15 years and greater than 65 years, is 2.5.

Education being one of the major socio economic factors influencing a person's behavior and attitude is believed to have an impact on child school attendance and grade attainment. The classification of educational level is done according to the current system of formal education which is based on a three-tier system: eight years of primary education, followed by four years of secondary education and tertiary education. Accordingly, as is the case with most developing countries, majority of house hold heads in the sample, 46.9% are without education while 26.5% have only primary level education. And only 3.7% and 0.7% of household heads have attained secondary and tertiary level education respectively. The rest 22.1% have informal education. Only 38% of the household head or any member of the household under analysis have performed some kind of income generating activities, whether in their own business or being employed.

Table 4.4 Summary Statistics on Educational level of House Hold Heads

Variables	Percentage from Sample
Educational level of the Head	
No Education	46.9%
Primary level	26.5%
Secondary level	3.7%
Tertiary level	0.7%
Informal Education	22.1%

Source: ERHS and own computation

Rather than using income and consumption expenditure directly as a determinant, use of alternatives measures has become increasingly documented (El Daw and Safaa, 2002). Filmer and Pritchett (1998), in their work argue that an index constructed from the questions about household assets and housing characteristics (e.g. drinking water and toilet facilities) works as

well, and arguably better, than income and consumption as a proxy for household long-run wealth. Hence the paper has used land size and total asset as a proxy for the household wealth index and used toilet and pipe water availability as a proxy for standard of living. Accordingly, as shown in the following table, the households have on average 10932.25 value of total asset in birr where the maximum being 235978 and the minimum only 10.5 birr. In addition the average plot size in hectare is 2.69 in which 0.002 is the minimum hectare owned by the households and 96.125 is the maximum, with adjustment of some outlier figures in the sample. The average education expenditure, school fee and other educational expenses, among the households in the sample is 50.9 birr: the minimum being 0 birr while the maximum is 3130 birr. The following table shows the summary statistics of the above variables.

Table 4.5 Summary Statistics on Total Asset, Total Plot size and Total Education Expenses (Mean, Maximum, minimum and Standard deviation)

Variable	Mean	Minimum	Maximum
Total Asset	10932.25 (15520.24)	10.5	235978
Total plot size	2.69 (7.82)	.002	96.12
Education expense	50.98 (212.8)	0	3130

Source: ERHS and own computation

The availability of toilet and pipe water in the household is taken as a proxy to measure the standard of living of the household. The availability of toilet in the household describe the availability of any kind of toilet whether, private, open latrine, flash or communal type of toilet. Accordingly 38% of the household in the sample don't have any kind of toilet available, while

the households who have pipe water are only 14.5%, for the rest 85.5%, their source of drinking water is either from pond, river, spring, well, bore hole, rain water or other.

Table 4.6 Summary Statistics on Availability of toilet and pipe water in the Household

Variable	Percentage from Sample
Toilet available (hh)	62%
Pipe water available (hh)	14.5%

Source: ERHS and own computation

Additional variables at the household level are included in the analysis of both current attendance and highest grade attainment as determinants; and descriptive statistics of this information will help create the general awareness about the variables. Thus, according to the data, 62% of the households have taken out loan in cash or in kind for different reasons, in which one of the reasons to take out the loan was to cover for educational expenses. In addition, about 51% of the households have been working off own farm during 12 months before the survey was conducted. Similarly, 51% of the households have received remittance or any gifts for the last 12 months. Moreover, only 6% of the households in the sample own a bank account whereas 13% of the households participate in at least one eqqub.

Regarding the community level variables, out of 23 peasant associations considered, 62% of them are said to have access to electricity, while 25% have access to communal pipe water source. The average distance from the PAs to the nearest primary school is on average 7.2 kilo meters.

4.2. Regression Results

There will be two equations to be estimated: the maximum likelihood probit estimates for current school enrolment and the ordered probit estimates for the highest grade completed. In each case the sample includes all children in the relevant and defined age group, with the other characteristics of the explanatory variables for both estimates being the same.

To check for possible collinearity between the variables, a pair wise correlation matrix was constructed among the variables in the estimation (refer Appendix II). Using the Gujarati's rule of thumb, if the pair wise correlation coefficient between regressors is greater than 0.8, then multicollinearity is high. However since all the reported pair wise correlation coefficients are less than 0.8, there is no sign of serious multicollinearity.

4.2.1. Current School Enrollment

The maximum likelihood estimates for current school enrollment (SCHATT) status of children aged 7-14 are presented in Table 4.7. The marginal probit estimates, which are more helpful for the interpretation, are reported in the table below (refer appendix IV).



Table 4.7 Binary Probit Estimates of Current Enrollment (7-14 years)

Variables	Coefficients
Child gender	-0.0039798 (0.0190385)
Child Age	0.3531328* (0.0436888)
Age Squared	-0.0150351* (0.0020673)
Child marital status	0.1159575 (0.0740228)
Child labour	0.1712067* (0.067643)
Biological child	0.0270572 (0.0282491)
Household headship	0.1053323* (0.0282626)
Head occupation	0.0141469 (0.0215758)
Household size	0.0074 (0.0045961)
Age of the household head	0.0019395* (0.0008983)
Marital status of the head	0.0567417* (0.0288554)
Availability of toilet	0.0412894 (0.0243505)
Availability of pipe water	0.1362658* (0.0238155)
Loan take	0.0033034 (0.0209378)
Household off farm participation(yr)	0.0028119 (0.0202072)
Total asset value	5.13e-08 (7.87e-07)
Total plot size(hec)	0.0007166 (0.0014355)
Remittance	-0.0444931* (0.0214795)
Income generating activity participation(yr)	-0.0050743 (0.0214117)
Bank ownership	-0.0016185 (0.0399166)
Eqqub membership	0.0783278* (0.0263727)

Variables	Coefficients
Total education expense	0.0000873 (0.0000573)
Primary Education	0.0933778* (0.0241152)
Secondary Education	0.1075725* (0.0400114)
Higher Education	0.1423249 (0.0675316)
Informal Education	-0.0157039 (0.0289848)
Average distance to school	0.0029412 (0.0046446)
Accessibility of electricity(COM)	-0.0361252 (0.0221693)
Accessibility of pipe water(COM)	0.06426* (0.025056)
Amhara	0.014477 (0.028835)
Tigray	0.1455866* (0.0291814)
SNNPR	-0.0852059* (0.033407)
N	2315
Prob > chi2	0.000
Wald X²	329.75
Pseudo R²	0.12
Log likelihood	- 1201.6255

Source: Own computation

*Significant at 5%

According to the result from the probit model, child age is seen to be a significant determinant of their school attendance. Apart from the age of children, the child being single tends to increase the probability of school attendance. However, unlike many studies, the children participating in labour activity (home, farm or off farm), has increased the probability of school attendance.

The variable that captures the leadership in the household, household headship was found to be significant as expected. It is obviously the case that female household heads increases the probability of children's school attendance.

Education has entered the model in level form, rather than by years of schooling. This is to overcome with the problem to how to rate informal education levels. The reference category for analyzing the results is the variable 'no education'. Accordingly, heads education is found to be significant at the primary and secondary level while the impact of higher and informal education level was not found to be significant. The result implies that children from household heads having primary and secondary level of education have higher probability of attending school when compared to children from household heads who do not have any education. This is mainly due to the low level of variation with regard to educational status; in addition there are very few numbers of household heads who have obtained higher level of education and few with informal education. It can therefore be generalized that children from households that have acquired formal education are likely to attend school than those children from the households with no education, other variables remaining constant.

The marital status of household head dummy takes a value of one if the head is currently married and zero otherwise. According to the regression result, currently married household head increases the probability of children school attendance, in addition their age have a positive effect in increasing the probability of current attendance, while occupation don't have any impact on the children current attendance.

Availability of pipe water at the household level is one of the variables that measure the standard of living of the household. On the same token, accessibility of pipe water in the peasant

association also shows the peasant association's status. Accordingly, both variables have been found significant. Hence the household with availability of pipe water and a peasant association with accessibility of pipe water increase their children's probability of school attendance. Hence, as it is found in many literatures, the better the standard of living the higher the probability of attending school.

One other variable that significantly explains children's probability of school attendance is the household membership in at least one eqqub. The result implies that households who are a member in at least one eqqub increase the probability of their children in attending school.

With regard to the regional dummies incorporated in the model, the regions that were found to be significantly different from the reference region, Oromia, are Tigray and SNNPRS but in opposite direction. According to the result, a child living in Tigray region has a higher probability of attending school than those living in Oromia, while a child living in SNNPRS has a lower probability of attending school than children in Oromia, other things remaining constant. The fact that Tigray region got a higher opportunity in sending children to school compared to the other regions is probably the presence of political fever that the region currently has.

4.2.2. Highest Grade Attained

The regression result for the ordered probit model of those children in the age group 12-25 is presented in Table 4.8. The age restriction in the analysis of highest grade obtained is assumed to allow for the differentiation between non-enrollment and non-attainment; this is an important difference (Maitra, 2001). A child with zero years of schooling either may not be enrolled in school yet or chooses not to attain (complete) any schooling. Hence restricting the age from 12-

25 will help differentiate non enrollment from non attainment, which implies that a child that has not been enrolled at the age of 12 will never enroll in school.

A positive and significant coefficient, in the ordered probit estimates, indicates that a particular explanatory variable increases the probability of attaining post primary schooling (grade 8+), while a negative significant effect implies that the relevant explanatory variables increases the probability of no schooling. To understand what is happening to the intermediate categories, there is a need to examine the marginal effects.

Table 4.8 Ordered Probit Estimates of Highest Grade Completed (Obtained) (12-25 years)

Variables	Coefficients
Child gender	-0.0857786 (0.0759716)
Child Age	9.367336* (2.216684)
Child Age Sq	-0.351643* (0.0853299)
Child marital status	0.0469491 (0.356509)
Child labour	0.4448531 (0.3845298)
Household head	0.1301012 (0.1401658)
Head occupation	-0.0210986 (0.0858194)
Household size	0.0295601 (0.0180004)
Age of the household head	0.0045209 (0.0033181)
Marital status of the head	0.1713843 (0.1090764)
Availability of toilet	0.0843219 (0.0950728)
Availability of pipe water	0.5399592* (0.1155202)
Loan take	0.0181034 (0.0824984)

Variables	Coefficients
Household off farm participation(yr)	0.0603002 (0.0802954)
Total asset value	-4.20e-06 (2.53e-06)
Total plot size(hec)	0.0013066 (0.0053511)
Remittance	-0.1731949* (0.0852481)
Income generating activity participation(yr)	0.0466458 (0.085352)
Bank ownership	0.1413195 (0.1525039)
Eqqub membership	0.0403971 (0.1160424)
Total education expense	0.0003625* (0.0001628)
Primary Education	0.2172895* (0.1048657)
Secondary Education	0.5772194* (0.2004712)
Higher Education	0.4075077 (0.3424941)
Informal Education	-0.0695653 (0.1153546)
Average distance to school	-0.0496852* (0.0193218)
Accessibility of electricity(COM)	-0.0011041 (0.0903312)
Accessibility of pipe water(COM)	-0.2740515* (0.106608)
Amhara	0.2473309* (0.1193271)
Tigray	0.6953371* (0.1567786)
SNNPR	-0.1940468 (0.1240211)
N	947
Prob > chi2	0.000
Wald X ²	154.07
Log likelihood	-840.701

*significant at 5%

Source: own Computation

As was the case with the first model, child age, age² and education were all found to be significant in affecting grade attained. Child age plays a positive significant effect on grade completed, which implies that age of the child increases the highest educational outcome of children in the specified age group. While the age square unlike the age variable affects the grade attainment negatively. This implies that the age square increases the probability of no schooling and age of the child increases the probability of post primary schooling.

In general, parental education matters as far as children educational attainment is concerned, specifically heads which are in primary and secondary level have a positive and significant impact on grade completion of children. That is relative to those household heads which have no education, the ones with primary and secondary school level increases the probability of attaining post primary school of their children. This may be because household's who have at least some education level have a better awareness on the benefits of educating a child.

The other factor which has a positive significant effect on grade completion is the availability of pipe water to the household, in which the presence of pipe water also significantly increases the probability of attaining post primary school. While the availability of pipe water at the community level also has a significant but negative effect on grade attainment, which implies that the variable increases the probability of no schooling. This opposite effect between the availability of pipe water at the household and community level in child's grade attainment may be because the former decreases the distance the children need to go to fetch water while the latter may require longer distance to go.

Unlike the case with the first model, total education expense of the household, the presence of remittance and average distance to school have a significant impact on determining the highest



grade completed. Different from what is expected, total education expense of the house hold was found to have a positive significant impact on grade attainment, which increases the highest educational outcome.

However the direction of relationship for the presence of remittance and the average distance to school was found to be negative as expected, which implies that the presence of these variables increases the probability of no schooling. And this implies that the children who earn remittance will be lazy to go longer distance, in order to attain a higher grade level.

With regard to regional dummies incorporated in the model, the regions that were found to be significantly different from the reference region Oromia are Tigray and Amhara. According to the result, children living in these regions, Tigray and Amhara, have a higher probability of attaining the post primary school *ceteris paribus*. The marginal results also confirm the above results for the intermediate categories.

The marginal effect results were calculated for each outcome in order to see the effect of the variables on each outcome (refer appendix VI). Accordingly, for the lowest predicted outcome age square, remittance, average distance to schooling and pipe water availability at the community level increases the probability of obtaining the lowest outcome. This is the same for the second predicted outcome in which those variables play a significant role in obtaining that level. However for the third predicted outcome the reverse is true. The variables Child age, pipe water availability at the household level, total education expense, household head education level at the primary and secondary school level and children of Amhara and Tigray region, all increases the probability of the child to obtain the education level in the outcome three category.

These factors however play a negative role for children in obtaining the previous predicted outcomes.

4.3. Main Findings of the Study

The main findings from the two models are similar with regard to some variables. The variables age and availability of pipe water are both found to significantly affect child schooling. Education of the household is also found to affect schooling positively in both cases. Educated households are more likely to have more awareness concerning educating a child. The way these household heads value children, are also expected to be different from household heads with no education. Those heads with no education, in addition to the expected lack of awareness even to the basics, may view educating a child as wasting their time and attach high opportunity costs to sending a child to school.

Even if the uneducated society with no sustainable income and social security system for the future may think that having children could be the only old age security system known to them, however, this is not complemented by educating the children. The other mechanism, through which higher level of education leads to higher opportunity for child's schooling is through the increase opportunity of the household head to participate in the labour force. Heads with education are likely to have their own means of income, which are expected to be aware of the labour market's return to an educated person. In addition, the fact that these heads will gain some amount of income will also cover the different costs related to school for their children.

The variable household headship, whether female or male, is included in both models as a dummy which takes value of one if the head is a woman and zero otherwise. However, it is found to be significant only for the first model. That is the head being a woman doesn't have any

effect on child grade attainment but only increases the probability that a child to be currently in school. The other variables which are included in both models but which have a significant effect only on the current school attendance is marital status of the child and the head, eqqub membership and a child participating in any labour activities. These variables found to have a significant effect on increasing the probability of current attendance. Unlike many studies, a child participating in any kind of labour activities other than being a student has increased the probability of current school attendance.

On the same token, variables which are included in both models but those which have a significant effect in grade attainment of children are the availability of remittance, pipe water at the community level and average distance to school. In line with many studies these variables are found to affect the grade attainment negatively which increases the probability of no schooling for children, as expected. Those children who may receive a remittance are expected to be loose in their schooling and attaining some grade level, while children who need to go more kilometers to fetch water or to go to school also have a probability to quit school early. The hypothesis that the presence of educational expenses is inversely related to child schooling was tested using the inclusion of the variable total education expenses. In contrary to what is expected, this variable is found to have a positive significant effect on the highest grade attainment of children.

With regard to region, children living in Amhara and Tigray are likely to have more schooling than those living in Oromia, other things remaining constant. The region SNNPR is found to have no significant difference from the base region, Oromia. In addition the region SNNPR is found to have a higher probability in children's current school attendance. Oromia being a diverse community is characterized by a large number of family size and pastoralist behavior.

This could reflect on the decision of educating a child as high cost of rearing and educating those children and attitude of the parents makes them to be alert on their decision. In addition, the two regions, Amhara and Tigray, have a higher probability of educating children. This could be because of the reason that these two regions were the ones who are politically favored at some point.

The above findings, except for the insignificance household size and child gender in explaining child schooling, are in line with initial premises. In addition, the variables child labour and education expenses, although significant the direction of their effect on child schooling found to be in contrary to what is expected. The fact that the above discussed socio economic variables affects the decision of educating a child shows that a sustainable achievement in not only currently educating a child but following until highest grade attainment can only be achieved through tackling major development issues related to education, empowerment and regional decisions with integrated policies.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The main Objective of this research has been to understand the major socio-economic determinants of child schooling in rural Ethiopia. The paper has employed two measures of child schooling: current school enrollment and highest level of schooling obtained/completed. The analysis of the current school enrollment was conducted using the binary probit model which is fairly standard. While the analysis of highest grade obtained have faced some methodological challenges as the researcher only observe the discrete level of schooling with high probability spike at zero level of schooling hence the researcher has used the ordered probit model. The socio-economic determinants that were expected to have an effect on child schooling were age, head's education, headship, marital status, distance to school and the standard of living measures.

The analysis of the study has shown that the major socio economic determinants of child schooling that were found to affect schooling significantly are age, head's education, availability of pipe water and region of residence. Marital status, child labour, household headship, household age and eqqub membership for current enrollment and average distance to school, remittance and total education expenditure for highest grade attainment also found to be significant respectively. Except for child labour and total education expense the direction of the variables found to affect child schooling as expected. However, Household size, gender, biological relationship of the child and asset value is not found to have a significant impact on child schooling.

The findings of the study indicate that child schooling is not only influenced by a single factor but socio-economic variables, which are inter related and inter dependent. The fact that these variables have an important implication that a policy that is directed to increasing child schooling through increasing the current enrollment rate and the highest grade level, should not only directly focus on the sectors campaign but should also be all rounded in addressing all these socio-economic variables that are significant in determining schooling decision of the household. It further sheds light on the fact that child education is an outcome of an overall development process of a nation with improved service on education; quality and quantity of the education sector with equity; health and increase in income of its people. In addition, it is a reflection of an improvement in the awareness and general status of the people at large. However, since achieving these development objectives takes a longer period of time and can be considered as a long term objective, until the development process brings the required socio-economic dynamics to bring full success in current enrollment and highest grade attainment possible for children, increasing access and creating awareness on the household heads must be developed.

Though this study mainly emphasized on those variables that affect child schooling and considers a one way relationship between these variables and child schooling variables, the possibility of feedback effect from schooling to the variables, cannot be all together ruled out. In addition, there may be other variables which could have an effect on schooling which are not included in this paper. Hence, there is a room for further investigation of the possible casual relationship between these variables and for the inclusion of new variables which could have a significant effect on schooling.

5.2 Recommendations

The main long term objective the country needs to meet is closing the gap between children in and out of school moreover between those children currently attending school and the highest grade attainment of those children. Because a child current school attendance will not guarantee the grade he/she will attain at the end of the day. Owing to the fact that achieving a sustainable development of the country so requires educated citizens which bases in educating children, and an all rounded effective policy measure to tackle the problem of child schooling is of significant value. Though this study only focused on rural households of Ethiopia, the implication of the variables that were found to affect schooling decisions of the household can be further extended to the rural areas as a whole and to the semi urban areas as well.

Hence from the discussion of the main findings of the study, the identification of education, child age, availability of pipe water in the household and the regions the household resides at as important variables in explaining both current enrollment and grade attainment, can give indications to clear policy measures to achieve the goal of increased schooling. Accordingly, the following policy measures are recommended.

- Provision of education services to households should be given due importance especially in rural parts of the country. They should be provided with all the necessary encouragements and empowerments like participation in income generating activities in order to increase the probability of sending their children to school especially for current attendance.
- To encourage children for constantly attending school and families for enrolling their children, since in many third world nations the decision is made by the house hold heads.

In addition, to strengthen the law enforcement mechanism towards educating a child, incentive mechanisms could also be planned for families who educate their children. For instance Mexico introduced an incentive scheme that made transfers to poor households in rural areas if their children enroll in school (Schultz, 2007a).

- Construction of infrastructural facilities with regard to increasing the service provided by the education sector should also be another policy objective to improve child schooling especially in the rural areas. Building schools nearby, roads and providing school facilities will decrease the distance to school and increases the opportunity to go to school which affects especially the grade attainment of children. In addition, fulfilling complementary needs, like availing of pipe water, which may make children busy will be of much importance.
- Concrete measures, specific to the different cultures and settings, should be adopted to abolish all discriminatory customs and practices that discourage children from going to school. Programs should be developed to promote educating a child in all spheres of the society.
- Those regions and cultures that may have special traits that discourage educating a child should be clearly identified and policy measures that are specific to those setups should be developed. In other words, rather than employing a 'one size fits all' policy direction, regions focused policies could be more effective in delivering the required target of high level of education.
- Policies should be geared towards achieving 'all children to be behind a school desk' as Eleni Muluneh said and with the highest grade possible to be attained. In addition, policies and the respective bodies also should work to achieve the MDG's by the 2015

especially on the education sector. In addition, creating awareness concerning the negative welfare implication of having uneducated child should also be give due importance to improve households awareness towards educating a child.

- In general, integrated and fully fledged policies must be incorporated together in comprehensive and coherent manner in order to tackle the problem related to schooling. Because a nation without educated labour force is like a car without wheel, in which the long term development could only be achieved as long as today's children are educated.

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APPENDICES

I. Descriptive summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
dgender	947	.4804646	.4998822	0	1
dmaritalst~s	947	.9883844	.1072047	0	1
childage	947	12.9113	.8469252	12	14
dchildlabour	947	.9904963	.0970738	0	1
dhhead	947	.1098205	.3128311	0	1
Dheadoccup~n	947	.4149947	.4929815	0	1
hhsz	947	7.237592	2.438144	2	16
Ndpt	947	3.702218	1.803223	1	11
Nchildren	947	4.229145	1.943514	1	10
ageH	947	50.89018	13.26875	15	100
dmstatusH	947	.7592397	.427771	0	1
davailabi~et	947	.6715945	.4698813	0	1
davailabi~at	947	.1499472	.3572083	0	1
dloantake	947	.6399155	.4802783	0	1
dhhofffarm~r	947	.5258712	.4995941	0	1
totalasset~e	947	13768.71	19025.62	16.2	235978
totplotsiz~c	947	2.771165	7.334183	.008	96.125
dremittance	947	.4667371	.499156	0	1
dincome~2mzs	947	.4033791	.4908348	0	1
dbankaccow~p	947	.0834213	.2766641	0	1
dequbmemb~p	947	.1478353	.3551242	0	1
totaleduc~e	947	80.82893	268.0356	0	2950
avedstsc1	947	7.329567	2.310312	2.1	11
daccessibl~y	947	.6198522	.4856795	0	1
daccesspip~t	947	.2249208	.4177508	0	1
dAMH_region	947	.2133052	.4098579	0	1
dTIG_region	947	.1045407	.3061223	0	1
dSNNP_region	947	.2745512	.4465237	0	1
PR_Educ	947	.3336853	.471778	0	1
SEC_Educ	947	.0506864	.2194724	0	1
HIgher_Educ	947	.0137276	.1164192	0	1
INF_Educ	947	.2206969	.4149357	0	1

Variable	Obs	Mean	Std. Dev.	Min	Max
dchild_gen~r	2315	.5006479	.5001076	0	1
childage	2315	10.58877	2.271018	7	14
dmaritalst~s	2315	.9784017	.1453992	0	1
dchildlabour	2315	.9732181	.1614802	0	1
dbiochild	2315	.8220302	.3825699	0	1
Dhhead	2315	.1053996	.3071339	0	1
Dheadoccup~n	2315	.4172786	.4932162	0	1
hhsz	2315	7.352052	2.385138	2	16
Ndpt	2315	3.855292	1.758855	1	11
Nchildren	2315	4.358531	1.877449	1	10
ageH	2315	49.84924	12.98534	15	100
dmstatusH	2315	.7667387	.4229986	0	1
davailabi~et	2315	.6768898	.4677654	0	1
davailabi~at	2315	.1473002	.3544815	0	1
dloantake	2315	.6488121	.4774447	0	1
dhhofffarm~r	2315	.5209503	.4996688	0	1
totalasset~e	2315	13043.08	18390.6	16.2	235978
totplotsiz~c	2315	2.715215	7.230225	.002	96.125
dremittance	2315	.4976242	.5001024	0	1
dincome~2mzs	2315	.4060475	.4911997	0	1
dbankaccow~p	2315	.0825054	.2751926	0	1
dequbmemb~p	2315	.1468683	.354051	0	1
totaleduc~e	2315	74.30518	260.0912	0	3130
avedstsc1	2315	7.310799	2.3237	2.1	11
daccessibl~y	2315	.6233261	.4846567	0	1
daccesspip~t	2315	.2466523	.4311557	0	1
dAMH_region	2315	.2211663	.4151219	0	1
dTIG_region	2315	.0984881	.2980379	0	1
dSNNP_region	2315	.2924406	.4549819	0	1
PR_Educ	2740	.3186131	.4660237	0	1
SEC_Educ	2740	.0459854	.2094917	0	1
HIgher_Educ	2740	.010219	.1005895	0	1
INF_Educ	2740	.2058394	.4043875	0	1

II. Multicollinearity Test (Pair wise correlation test)

	dchil~er	childage	dmarit~s	dchil~ur	dschla~e	dbioch~d	Dhhead	Dheado~n	hhsiz	ageH	dmstat~H	davai~et	davai~at
dchild_gen~r	1.0000												
childage	0.0246	1.0000											
dmaritalst~s	0.0180	0.1157	1.0000										
dchildlabour	-0.0479	0.1396	0.0490	1.0000									
dschlatten~e	-0.0069	0.2108	0.0728	0.0873	1.0000								
dbiochild	0.0277	0.0271	0.0319	0.0138	0.0394	1.0000							
Dhhead	-0.0004	0.0213	-0.0264	-0.0389	0.0197	-0.0389	1.0000						
Dheadocupp~n	-0.0134	-0.0034	0.0173	-0.0061	0.0125	0.0456	0.1831	1.0000					
hhsiz	-0.0395	-0.0382	-0.0267	0.0121	0.0695	0.1459	-0.1533	-0.0801	1.0000				
ageH	-0.0157	0.0706	0.0086	0.0255	0.0089	-0.3709	-0.0640	-0.2715	0.0414	1.0000			
dmstatusH	-0.0258	-0.0158	0.0445	0.0414	0.0497	0.2721	-0.4493	-0.1630	0.2755	-0.0288	1.0000		
davailabi~et	-0.0010	0.0002	-0.0328	0.0284	0.0301	0.0504	-0.0847	0.0377	0.1648	0.0229	0.1125	1.0000	
davailabi~at	0.0129	0.0082	-0.0389	-0.0367	0.1207	-0.0201	-0.0434	-0.0081	0.0250	-0.0304	0.0390	0.0578	1.0000
dloantake	0.0127	-0.0121	0.0214	0.0125	0.0029	0.0268	0.0109	0.0188	0.0024	-0.0514	0.0050	0.0064	0.0096
dhhofffarm~r	0.0090	0.0133	0.0300	-0.0198	0.0435	0.0353	-0.0031	0.1136	0.0589	-0.0359	0.0497	-0.0783	-0.0796
totalasset~e	-0.0151	0.0251	-0.0110	0.0420	0.0764	0.0005	-0.0943	-0.0447	0.2504	0.0013	0.1293	-0.0792	0.1250
totplotsiz~c	0.0469	0.0094	-0.0105	0.0284	0.0211	-0.0074	0.0374	0.0052	0.1059	-0.0104	0.0118	-0.0044	-0.0378
dremittance	-0.0013	-0.0290	-0.0007	-0.0115	-0.0626	-0.0587	0.1001	0.0513	-0.0263	0.0868	-0.0455	0.0337	0.0056
dincome~2mzs	0.0253	0.0060	-0.0163	0.0118	-0.0154	0.0329	0.0227	0.1958	0.0620	-0.0602	0.0713	0.0333	0.0559
dbankaccow~p	-0.0082	0.0080	-0.0202	-0.0086	0.0401	0.0492	-0.0518	0.0646	0.1137	-0.0606	0.0577	0.0125	0.1279
deqqubmemb~p	0.0141	0.0155	0.0616	0.0008	0.0657	0.0112	0.0205	0.0152	0.0211	-0.0310	0.0413	-0.0708	0.0755
totaleduc~e	-0.0183	0.0089	-0.0026	0.0284	0.0774	0.0498	-0.0161	-0.0450	0.2440	0.0313	0.0505	0.0266	0.1849
avedstsc1	0.0014	-0.0047	-0.0431	-0.0106	0.0648	-0.0426	0.0089	0.0584	0.0769	0.0748	0.0414	-0.1523	0.0364
daccessibl~y	0.0171	0.0170	-0.0051	-0.0185	-0.0101	-0.0168	-0.0438	0.0395	-0.0138	0.0480	0.0371	0.2807	0.1495
daccesspip~t	0.0023	-0.0305	-0.0046	-0.0354	0.0733	-0.0089	-0.0430	-0.0656	0.0613	-0.0173	0.0431	-0.0782	0.1665
dAMH_region	-0.0153	0.0021	0.0505	-0.0470	0.0031	-0.0187	0.0374	-0.0668	-0.1302	0.0057	0.0207	-0.3017	-0.0952
dTIG_region	-0.0062	0.0094	-0.0207	-0.0799	0.0737	-0.0471	0.0140	0.1113	-0.0464	0.0775	-0.1502	0.0982	-0.1128
dSNNP_region	-0.0056	-0.0266	0.0367	0.0537	-0.1301	0.0682	0.0144	0.0241	0.0337	-0.0445	0.0537	0.3102	-0.0502
PR_Educ	-0.0281	-0.0329	0.0228	-0.0005	0.0523	0.1738	-0.1301	0.0195	0.1884	-0.3179	0.2047	0.1243	0.0242
SEC_Educ	0.0115	0.0005	-0.0331	0.0019	0.0439	0.0616	-0.0348	0.1345	0.0589	-0.1489	0.0860	0.0971	0.1863
Higher_Educ	-0.0165	0.0157	0.0158	0.0177	0.0391	-0.0040	-0.0366	0.0428	0.0186	-0.0644	-0.0091	0.0298	0.1176
INF_Educ	0.0229	0.0339	0.0165	-0.0020	-0.0198	-0.0018	-0.0522	-0.0734	-0.0480	0.1345	0.0875	-0.2011	-0.0810

	dloant~e	dhhoff~r	totala~e	totplo~c	dremi~e	din~2mzs	dbanka~p	deqqub~p	totala~e	avedst~l	daces~y	daces~t	dAMH_r~n
dloantake	1.0000												
dhhofffarm~r	0.0553	1.0000											
totalasset~e	-0.1812	0.0325	1.0000										
totplotsiz~c	-0.0456	0.0477	0.1165	1.0000									
dremittance	0.0300	-0.0296	-0.1872	-0.0425	1.0000								
dincome~2mzs	0.0205	-0.0276	0.0188	0.0555	0.1324	1.0000							
dbankaccow~p	-0.0886	0.0330	0.3850	0.0386	-0.0943	-0.0242	1.0000						
deqqubmemb~p	-0.0322	0.0070	0.2048	0.0464	0.0044	0.1514	0.0752	1.0000					
totaleduc~e	0.0235	-0.0545	0.2958	0.0705	-0.0979	0.0532	0.1414	-0.0084	1.0000				
avedstsc1	-0.0947	0.1281	0.0801	-0.0474	0.1842	0.0579	0.0094	0.1106	0.0343	1.0000			
daccessibl~y	-0.0266	-0.1762	-0.0841	-0.1307	-0.0411	0.0419	0.1035	0.0304	0.0724	-0.0891	1.0000		
daccesspip~t	-0.0052	-0.0370	0.0924	-0.0720	-0.0704	-0.0221	0.0724	-0.0081	0.1184	0.1209	0.2525	1.0000	
dAMH_region	-0.1749	0.0277	0.1796	-0.0069	-0.0703	-0.0358	0.1201	0.2464	-0.0826	-0.0791	-0.1056	0.0814	1.0000
dTIG_region	0.0336	0.1632	-0.1591	-0.0909	0.0944	-0.2290	-0.0728	-0.1289	-0.0736	0.2101	-0.1350	-0.1891	-0.1761
dSNNP_region	0.0751	-0.2047	-0.2542	-0.0006	0.2851	0.2535	-0.1479	-0.0307	-0.0990	-0.2496	0.0706	-0.3679	-0.3426
PR_Educ	-0.0052	-0.0057	-0.0221	0.0535	-0.0019	0.0899	0.0345	0.0048	0.0578	-0.0515	0.0748	-0.0309	-0.1370
SEC_Educ	0.0512	-0.0176	0.2195	0.0294	-0.0343	0.0843	0.1232	0.0204	0.1227	0.0179	0.0383	-0.0141	-0.0809
Higher_Educ	-0.0161	0.0037	0.0052	-0.0117	-0.0323	-0.0047	0.0127	-0.0442	0.0724	-0.0467	-0.0102	0.0056	-0.0568
INF_Educ	-0.0326	0.0816	0.1284	0.0106	-0.0789	-0.0272	0.0424	0.1221	-0.0374	0.0559	-0.0717	0.1070	0.3976

	dTIG_r~n	dSNNP~n	PR_Educ	SEC_Educ	Higher~c	INF_Educ
dTIG_region	1.0000					
dSNNP_region	-0.2125	1.0000				
PR_Educ	-0.0988	0.1486	1.0000			
SEC_Educ	-0.0766	0.0842	-0.1713	1.0000		
Higher_Educ	-0.0077	0.0126	-0.0788	-0.0247	1.0000	
INF_Educ	-0.1102	-0.2768	-0.3751	-0.1176	-0.0541	1.0000

III. Child labour participation (7-14 years)

dummy for child labor if the child participate s in any labour activities, 1 if t	Freq.	Percent	Cum.
	0	62	2.67
1	2,261	97.33	100.00
Total	2,323	100.00	

Child labour participation (12-25 years)

dummy for child labor if the child participates in any labour activities, 1 if t	Freq.	Percent	Cum.
0	9	0.94	0.94
1	947	99.06	100.00
Total	956	100.00	

IV. Marginal effects of the binary probit result

Iteration 0: log likelihood = -1372.498
 Iteration 1: log likelihood = -1210.6462
 Iteration 2: log likelihood = -1207.6445
 Iteration 3: log likelihood = -1207.6255
 Iteration 4: log likelihood = -1207.6255

Probit regression, reporting marginal effects

Number of obs = 2315
 LR chi2(32) = 329.75
 Prob > chi2 = 0.0000
 Pseudo R2 = 0.1201

Log likelihood = -1207.6255

dschla~e	dF/dx	Std. Err.	z	P> z	x-bar	[95% C.I.]
dchil~er*	-.0039798	.0190385	-0.21	0.834	.500648	-.041294	.033335	
childage	.3531328	.0436888	8.09	0.000	10.5888	.267504	.438761	
SOAge	-.0150351	.0020673	-7.28	0.000	117.277	-.019087	-.010983	
dmarit~s*	.1159575	.0740228	1.68	0.093	.978402	-.029125	.261039	
dbioch~d*	.0270572	.0282491	0.97	0.330	.82203	-.02831	.082424	
dchil~ur*	.1712067	.067643	2.73	0.006	.973218	.038629	.303785	
Dhhead*	.1053323	.0282626	3.29	0.001	.1054	.049939	.160726	
Dheado~n*	.0141469	.0215758	0.65	0.513	.417279	-.028141	.056435	
hhsiz	.0074	.0045961	1.61	0.107	7.35205	-.001608	.016408	
ageH	.0019395	.0008983	2.16	0.031	49.8492	.000179	.0037	
dmstat~H*	.0567417	.0288554	2.02	0.044	.766739	.000186	.113297	
davai~et*	.0412894	.0243505	1.72	0.086	.67689	-.006437	.089015	
davai~at*	.1362658	.0238155	4.88	0.000	.1473	.089588	.182943	
dloant~e*	.0033034	.0209378	0.16	0.875	.648812	-.037734	.044341	
dhhoff~r*	.0028119	.0202072	0.14	0.889	.52095	-.036793	.042417	
totala~e	5.13e-08	7.87e-07	0.07	0.948	13043.1	-1.5e-06	1.6e-06	
totplo~c	.0007166	.0014355	0.50	0.618	2.71522	-.002097	.00353	
dremi~t*	-.0444931	.0214795	-2.07	0.038	.497624	-.086592	-.002394	
din~2mzs*	-.0050743	.0214117	-0.24	0.812	.406048	-.047041	.036892	
dbanka~p*	-.0016185	.0399166	-0.04	0.968	.082505	-.079854	.076617	
deqqub~p*	.0783278	.0263727	2.76	0.006	.146868	.026638	.130017	
totala~e	.0000873	.0000573	1.52	0.128	74.3052	-.000025	.0002	
avedst~l	.0029412	.0046446	0.63	0.527	7.3108	-.006162	.012044	
daces~y*	-.0361252	.0221693	-1.61	0.107	.623326	-.079576	.007326	
daces~t*	.06426	.025056	2.46	0.014	.246652	.015151	.113369	
PR_Educ*	.0933778	.0241152	3.74	0.000	.353348	.046113	.140643	
SEC_Educ*	.1075725	.0400114	2.30	0.021	.050972	.029152	.185993	
Hlgher~c*	.1423249	.0675316	1.59	0.112	.011231	.009965	.274684	
INF_Educ*	-.0157039	.0289848	-0.55	0.585	.204752	-.072513	.041105	
dAMH_r~n*	.014477	.028835	0.50	0.619	.221166	-.042039	.070993	
dTIG_r~n*	.1455866	.0291814	4.04	0.000	.098488	.088392	.202781	
dSNNP~n*	-.0852059	.033407	-2.62	0.009	.292441	-.150682	-.019729	
obs. P	.7200864							
pred. P	.7445514	(at x-bar)						

(*) dF/dx is for discrete change of dummy variable from 0 to 1
 z and P>|z| correspond to the test of the underlying coefficient being 0

V. Ordered probit Result

Iteration 0: log likelihood = -917.73752
 Iteration 1: log likelihood = -841.32342
 Iteration 2: log likelihood = -840.70335
 Iteration 3: log likelihood = -840.70129
 Iteration 4: log likelihood = -840.70129

Ordered probit regression
 Log likelihood = -840.70129

Number of obs = 947
 LR chi2(31) = 154.07
 Prob > chi2 = 0.0000
 Pseudo R2 = 0.0839

grdatt_order	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
dgender	-.0857786	.0759716	-1.13	0.259	-.2346802	.063123
dmaritalst~s	.0469491	.356509	0.13	0.895	-.6517956	.7456938
childage	9.367336	2.216684	4.23	0.000	5.022715	13.71196
CageSQ	-.351643	.0853299	-4.12	0.000	-.5188864	-.1843995
dchildlabour	.4448531	.3845298	1.16	0.247	-.3088115	1.198518
dhhead	.1301012	.1401658	0.93	0.353	-.1446187	.4048211
dheadoccup~n	-.0210986	.0858194	-0.25	0.806	-.1893014	.1471042
hhsiz	.0295601	.0180004	1.64	0.101	-.0057201	.0648402
ageH	.0045209	.0033181	1.36	0.173	-.0019823	.0110242
dmstatusH	.1713843	.1090764	1.57	0.116	-.0424015	.3851701
davailabi~et	.0843219	.0950728	0.89	0.375	-.1020174	.2706612
davailabi~at	.5399592	.1155202	4.67	0.000	.3135437	.7663746
dloantake	.0181034	.0824984	0.22	0.826	-.1435905	.1797973
dhhofffarm~r	.0603002	.0802954	0.75	0.453	-.0970759	.2176762
totalasset~e	-4.20e-06	2.53e-06	-1.66	0.097	-9.16e-06	7.60e-07
totplotsiz~c	.0013066	.0053511	0.24	0.807	-.0091814	.0117945
dremittance	-.1731949	.0852481	-2.03	0.042	-.340278	-.0061117
dincome~2mzs	.0466458	.085352	0.55	0.585	-.1206409	.2139326
dbankaccow~p	.1413195	.1525039	0.93	0.354	-.1575826	.4402215
dequbmemb~p	.0403971	.1160424	0.35	0.728	-.1870417	.267836
totaleduc~e	.0003625	.0001628	2.23	0.026	.0000434	.0006816
avedstsc1	-.0496852	.0193218	-2.57	0.010	-.0875553	-.0118151
daccessibl~y	-.0011041	.0903312	-0.01	0.990	-.1781499	.1759418
daccessip~t	-.2740515	.106608	-2.57	0.010	-.4829993	-.0651036
dAMH_region	.2473309	.1193271	2.07	0.038	.013454	.4812078
dTIG_region	.6953371	.1567786	4.44	0.000	.3880566	1.002618
dsNNP_region	-.1940468	.1240211	-1.56	0.118	-.4371238	.0490301
PR_Educ	.2172895	.1048657	2.07	0.038	.0117566	.4228224
SEC_Educ	.5772194	.2004712	2.88	0.004	.1843031	.9701358
HIGher_Educ	.4075077	.3424941	1.19	0.234	-.2637684	1.078784
INF_Educ	-.0695653	.1153546	-0.60	0.546	-.2956561	.1565256
/cut1	61.59463	14.36774			33.43437	89.75489
/cut2	63.38894	14.37505			35.21435	91.56352
/cut3	65.84793	14.38424			37.65534	94.04053

VI. Marginal effect results of the ordered probit model

Marginal effects after oprobit
 $y = \text{Pr}(\text{grdatt_order}=0)$ (predict, outcome(0))
 $= .08797686$

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	X
dgender*	.0137304	.01222	1.12	0.261	-.010211	.037672	.480465	
dmarit~s*	-.0077309	.06051	-0.13	0.898	-.126319	.110857	.988384	
childage	-1.49564	.51069	-2.93	0.003	-2.49657	-.494707	12.9113	
cAgeSQ	.0561452	.0195	2.88	0.004	.017919	.094372	167.418	
dchild~r*	-.0933981	.10078	-0.93	0.354	-.290932	.104135	.990496	
Dhhead*	-.0193818	.01945	-1.00	0.319	-.057495	.018731	.10982	
Dheado~n*	.003377	.01377	0.25	0.806	-.023611	.030365	.414995	
hhsiz	-.0047197	.00292	-1.62	0.106	-.01044	.001	7.23759	
ageH	-.0007218	.00054	-1.34	0.179	-.001774	.00033	50.8902	
dmstat~H*	-.0290566	.01964	-1.48	0.139	-.067553	.009439	.75924	
davai~et*	-.0137313	.01581	-0.87	0.385	-.044709	.017246	.671595	
davai~at*	-.0666548	.01169	-5.70	0.000	-.089564	-.043746	.149947	
dloant~e*	-.0029004	.01326	-0.22	0.827	-.028896	.023095	.639916	
dhhoff~r*	-.0096494	.01289	-0.75	0.454	-.034912	.015613	.525871	
totala~e	6.71e-07	.00000	1.64	0.101	-1.3e-07	1.5e-06	13768.7	
totplo~c	-.0002086	.00085	-0.24	0.807	-.001884	.001467	2.77116	
dremi~e*	.0278976	.01395	2.00	0.046	.000552	.05244	.466737	
din~2mzs*	-.0074029	.01347	-0.55	0.583	-.033804	.018999	.403379	
dbanka~p*	-.020817	.02069	-1.01	0.314	-.061364	.01973	.083421	
deqqub~p*	-.0063268	.01783	-0.35	0.723	-.041264	.028611	.147835	
totala~e	-.0000579	.00003	-2.15	0.032	-.000111	-5.1e-06	80.8289	
avedst~l	.007933	.00318	2.50	0.013	.001704	.014162	7.32957	
daces~y*	.0001762	.01442	0.01	0.990	-.028082	.028434	.619852	
daces~t*	.0484139	.0208	2.33	0.020	.007639	.089189	.224921	
dAMH_r~n*	-.0358802	.01581	-2.27	0.023	-.066874	-.004886	.213305	
dTIG_r~n*	-.0760828	.01238	-6.15	0.000	-.100343	-.051823	.104541	
dSNNP~n*	.0328776	.02232	1.47	0.141	-.010869	.076624	.274551	
PR_Educ*	-.0330764	.01534	-2.16	0.031	-.063146	-.003007	.333685	
SEC_Educ*	-.0641087	.01505	-4.26	0.000	-.093605	-.034612	.050686	
Hlgher~c*	-.0492637	.02983	-1.65	0.099	-.107729	.009202	.013728	
INF_Educ*	.0114027	.01941	0.59	0.557	-.026644	.04945	.220697	

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Marginal effects after oprobit
 $y = \text{Pr}(\text{grdatt_order}=1)$ (predict, outcome(1))
 $= .58241154$

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	X
dgender*	.0172889	.01532	1.13	0.259	-.01274	.047318	.480465	
dmarit~s*	-.009087	.06583	-0.14	0.890	-.138113	.119939	.988384	
childage	-1.895127	.47506	-3.99	0.000	-2.82622	-.964036	12.9113	
cAgeSQ	.0711417	.01824	3.90	0.000	.0354	.106883	167.418	
dchild~r*	-.0487518	.00871	-5.59	0.000	-.065832	-.031671	.990496	
Dhhead*	-.0286873	.03341	-0.86	0.391	-.094171	.036797	.10982	
Dheado~n*	.0042541	.01725	0.25	0.805	-.029552	.03806	.414995	
hhsiz	-.0059804	.00368	-1.63	0.104	-.013193	.001232	7.23759	
ageH	-.0009146	.00068	-1.35	0.176	-.00224	.000411	50.8902	
dmstat~H*	-.0316602	.0184	-1.72	0.085	-.067732	.004412	.75924	
davai~et*	-.0165869	.01822	-0.91	0.363	-.052293	.01912	.671595	
davai~at*	-.1396768	.03562	-3.92	0.000	-.209488	-.069866	.149947	
dloant~e*	-.0036452	.01654	-0.22	0.826	-.036053	.028763	.639916	
dhhoff~r*	-.0121602	.01617	-0.75	0.452	-.043855	.019535	.525871	
totala~e	8.50e-07	.00000	1.64	0.101	-1.6e-07	1.9e-06	13768.7	
totplo~c	-.0002643	.00108	-0.24	0.807	-.002387	.001858	2.77116	
dremi~e*	.0345725	.01703	2.03	0.042	.001199	.067946	.466737	
din~2mzs*	-.009514	.01757	-0.54	0.588	-.043942	.024914	.403379	
dbanka~p*	-.0315548	.03714	-0.85	0.396	-.104354	.041244	.083421	
deqqub~p*	-.0083858	.0247	-0.34	0.734	-.056804	.040033	.147835	
totala~e	-.0000733	.00003	-2.18	0.029	-.000139	-7.5e-06	80.8289	
avedst~l	.0100519	.00401	2.51	0.012	.002197	.017907	7.32957	
daces~y*	.0002234	.01828	0.01	0.990	-.035613	.036059	.619852	
daces~t*	.0470515	.01564	3.01	0.003	.016407	.077696	.224921	
dAMH_r~n*	-.0560576	.02997	-1.87	0.061	-.114796	.002681	.213305	
dTIG_r~n*	-.1922535	.05107	-3.76	0.000	-.292344	-.092163	.104541	
dSNNP~n*	.0358725	.02093	1.71	0.087	-.005154	.076899	.274551	
PR_Educ*	-.0466577	.024	-1.94	0.052	-.093697	.000382	.333685	
SEC_Educ*	-.1593968	.06556	-2.43	0.015	-.287892	-.030902	.050686	
Hlgher~c*	-.1075635	.10694	-1.01	0.315	-.317167	.102039	.013728	
INF_Educ*	.0135548	.02163	0.63	0.531	-.028847	.055956	.220697	

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Marginal effects after oprobit
y = Pr(grdatt_order==2) (predict, outcome(2))
= .32774569

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	x
dgender*	-.03051	.02699	-1.13	0.258	-.08341	.02239	.480465	
dmarit~s*	.0165563	.12447	0.13	0.894	-.227405	.260518	.988384	
childage	3.335004	.77655	4.29	0.000	1.81299	4.85702	12.9113	
CAgeSQ	-.1251936	.0299	-4.19	0.000	-.183802	-.066585	167.418	
dchild~r*	.1406766	.10382	1.36	0.175	-.062803	.344156	.990496	
Dhhead*	.0471684	.05163	0.91	0.361	-.054025	.148362	.10982	
Dheado~n*	-.0075061	.03051	-0.25	0.806	-.067298	.052286	.414995	
hhsiz	.0105241	.00641	1.64	0.101	-.002046	.023094	7.23759	
ageH	.0016096	.00118	1.36	0.173	-.000706	.003925	50.8902	
dmsat~H*	.0598124	.03723	1.61	0.108	-.013164	.132789	.75924	
davai~et*	.0298359	.03343	0.89	0.372	-.035682	.095354	.671595	
davai~at*	.2004449	.04344	4.61	0.000	.115298	.285592	.149947	
dloant~e*	.0064386	.02931	0.22	0.826	-.051007	.063884	.639916	
dhhoff~r*	.0214519	.02854	0.75	0.452	-.034487	.077391	.525871	
totala~e	-1.50e-06	.00000	-1.66	0.098	-3.3e-06	2.7e-07	13768.7	
totplo~c	.0004652	.0019	0.24	0.807	-.003269	.004199	2.77116	
dremi~e*	-.0614467	.03014	-2.04	0.041	-.12052	-.002374	.466737	
din~2mzs*	.0166354	.03049	0.55	0.585	-.043119	.07639	.403379	
dbanka~p*	.0513698	.05645	0.91	0.363	-.059262	.162001	.083421	
deqqub~p*	.0144619	.04177	0.35	0.729	-.067401	.096325	.147835	
total~e	.0001291	.00006	2.22	0.027	.000015	.000243	80.8289	
avedst~l	-.0176892	.00689	-2.57	0.010	-.031196	-.004182	7.32957	
daces~y*	-.0003931	.03216	-0.01	0.990	-.063433	.062646	.619852	
daces~t*	-.0941259	.03512	-2.68	0.007	-.162966	-.025286	.224921	
dAMH_r~n*	.0901016	.04426	2.04	0.042	.003348	.176856	.213305	
dTIG_r~n*	.2584294	.05706	4.53	0.000	.146598	.370261	.104541	
dSNNP~n*	-.0677213	.04232	-1.60	0.110	-.150674	.015231	.274551	
PR_Educ*	.0782783	.03814	2.05	0.040	.003528	.153029	.333685	
SEC_Educ*	.2158686	.07466	2.89	0.004	.069546	.362191	.050686	
HIGher~c*	.1524165	.13039	1.17	0.242	-.103136	.407969	.013728	
INF_Educ*	-.0245656	.04039	-0.61	0.543	-.103726	.054595	.220697	

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Marginal effects after oprobit
y = Pr(grdatt_order==3) (predict, outcome(3))
= .00186591

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	x
dgender*	-.0005093	.00052	-0.97	0.332	-.001538	.000519	.480465	
dmarit~s*	.0002616	.00186	0.14	0.888	-.003389	.003912	.988384	
childage	.0557619	.0305	1.83	0.067	-.004013	.115537	12.9113	
CAgeSQ	-.0020933	.00115	-1.82	0.068	-.004344	.000157	167.418	
dchild~r*	.0014733	.00102	1.45	0.147	-.000517	.003463	.990496	
Dhhead*	.0009006	.00121	0.74	0.457	-.001473	.003275	.10982	
Dheado~n*	-.000125	.00051	-0.24	0.807	-.001126	.000876	.414995	
hhsiz	.000176	.00014	1.23	0.217	-.000103	.000455	7.23759	
ageH	.0000269	.00002	1.10	0.272	-.000021	.000075	50.8902	
dmsat~H*	.0009044	.0007	1.29	0.199	-.000474	.002283	.75924	
davai~et*	.0004823	.00058	0.83	0.404	-.00065	.001615	.671595	
davai~at*	.0058867	.0034	1.73	0.083	-.000776	.01255	.149947	
dloant~e*	.000107	.00049	0.22	0.826	-.000849	.001063	.639916	
dhhoff~r*	.0003577	.00051	0.70	0.484	-.000644	.00136	.525871	
totala~e	-2.50e-08	.00000	-1.25	0.210	-6.4e-08	1.4e-08	13768.7	
totplo~c	7.78e-06	.00003	0.24	0.809	-.000055	.000071	2.77116	
dremi~e*	-.0010233	.00073	-1.40	0.161	-.002453	.000406	.466737	
din~2mzs*	.0002815	.00054	0.52	0.605	-.000785	.001348	.403379	
dbanka~p*	.001002	.00137	0.73	0.464	-.001683	.003687	.083421	
deqqub~p*	.0002507	.00076	0.33	0.741	-.001238	.00174	.147835	
total~e	2.16e-06	.00000	1.51	0.132	-6.5e-07	5.0e-06	80.8289	
avedst~l	-.0002958	.0002	-1.51	0.132	-.000681	.000089	7.32957	
daces~y*	-6.57e-06	.00054	-0.01	0.990	-.001061	.001048	.619852	
daces~t*	-.0013395	.00084	-1.59	0.111	-.002988	.000309	.224921	
dAMH_r~n*	.0018362	.00143	1.29	0.198	-.000961	.004634	.213305	
dTIG_r~n*	.0099069	.00606	1.64	0.102	-.001967	.021781	.104541	
dSNNP~n*	-.0010288	.00081	-1.28	0.202	-.002609	.000551	.274551	
PR_Educ*	.0014558	.0011	1.33	0.184	-.000691	.003603	.333685	
SEC_Educ*	.0076369	.00581	1.31	0.189	-.003754	.019028	.050686	
HIGher~c*	.0044107	.00635	0.69	0.488	-.008041	.016863	.013728	
INF_Educ*	-.0003919	.00065	-0.60	0.545	-.001662	.000878	.220697	

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Declaration


I, the undersigned, declare that this thesis is my original work and has not been presented, in part or whole, in any other university or collage. All sources of materials used for this thesis have been acknowledged.

The Examiners' comments have been duly incorporated.

Declared by:

Name Muna Degemu
Signature 
Date 07/03/2012

Confirmed by:

Name Teshome Mulat
Signature 
Date 7/3/2012